

**ATTACHMENT 5****MATERIAL SAFETY DATA SHEETS (MSDS) AVAILABLE FOR SUBSTANCES  
IDENTIFIED AT SITE G**

1. Organic Compounds\*
2. Metals and Cyanide\*\*

\* Based upon Tables 4-10, 4-11, 4-20 and 4-26, Expanded Site Investigation, Dead Creek Project Sites at Cahoka/Sauget, Illinois, Final Report, dated May 1988 by Ecology and Environment, Inc. ("E&E Site Investigation").

\*\*Based upon pages 4-112, 4-159 and 4-167, and Table 4-26, E&E Site Investigation.

**1. Available MSDS For Organic Compounds**





**Material Safety Data Sheet**  
May be used to comply with  
OSHA's Hazard Communication Standard,  
29 CFR 1910.1200. Standard must be  
consulted for specific requirements.

**U.S. Department of Labor**  
Occupational Safety and Health Administration  
(Non-Mandatory Form)  
Form Approved  
OMB No. 1218-0072

Note: Blank spaces are not permitted. If any item is not applicable, or no  
information is available, the space must be marked to indicate that.

IDENTITY (As Used on Label and List) Code L

**Section I**

Manufacturer's Name <b>MISSISSIPPI LINE COMPANY</b>	Emergency Telephone Number <b>(314) 883-5731</b>
Address (Number, Street, City, State, and ZIP Code) <b>P.O. Drawer 31</b>	Telephone Number for Information <b>(314) 883-5731</b>
<b>Rwy. 61</b>	Date Prepared <b>March 1989</b>
<b>Sta. Genevieve, MO 63670</b>	Signature of Preparer (optional)

**Section II — Hazardous Ingredients/Identity Information**

Hazardous Components (Specific Chemical Identity, Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
Calcium Oxide; Quicklime	5 mg/m <sup>3</sup>	2 mg/m <sup>3</sup>		to 40%
Calcium Hydroxide; Slaked Lime	5 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>		to 10%
Crystalline Silica	0.1 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>		0.1 to 0.5%

Code L is not listed on the NTP, IARC, or OSHA lists of carcinogens. Crystalline silica, a component of this product, is listed by IARC and NTP as a known human carcinogen. IARC has determined that there is sufficient evidence for carcinogenicity to experimental animals exposed to crystalline silica and limited evidence for carcinogenicity to humans. "Limited evidence" means that a causal relationship is possible; however, other explanations such as chance, bias or confounding factors cannot adequately be excluded.

**Section III — Physical/Chemical Characteristics**

Boiling Point (Calcium Oxide)	5162°F	Specific Gravity (H <sub>2</sub> O = 1)	Approximately	3.0
Vapor Pressure (mm Hg)	NA	Melting Point	Loses Water	1076°F
Vapor Density (AIR = 1)	NA	Evaporation Rate (Butyl Acetate = 1)		NA
Solubility in Water	About 0.2% @ 0°C			
Appearance and Odor	Tan Powder; odorless			

**Section IV — Fire and Explosion Hazard Data**

Flash Point (Method Used)	NA	Flammable Limits	NA	LEL	UEL
Extinguishing Media	NA				
Special Fire Fighting Procedures	NA				
Unusual Fire and Explosion Hazards	NA				

(Reproduce locally)

**Section V — Reactivity Data**

Stability	Unstable		Conditions to Avoid	NA
	Stable	X		

Incompatibility (Materials to Avoid)      Acids, Fluorine

Hazardous Decomposition or Byproducts      None

Hazardous Polymerization	May Occur		Conditions to Avoid	NA
	Will Not Occur	X		

**Section VI — Health Hazard Data**

Route(s) of Entry:      Inhalation?      YES      Skin?      YES      Ingestion?      YES

Health Hazards (Acute and Chronic)      Corrosive to skin and eyes. Causes irritation and inflammation of mucous membrane and respiratory passages.

Long term exposure can cause ulceration and perforation of nasal septum, silicosis.

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
Oxide and Hydroxide	NO	NO	NO
Crystalline Silica	NO	YES	Not as a carcinogen

Signs and Symptoms of Exposure  
Irritation and burning

Medical Conditions  
Generally Aggravated by Exposure      Respiratory disease, skin condition.

Emergency and First Aid Procedures  
Flush skin and eyes with water. Remove to fresh air. Get medical attention.

**Section VII — Precautions for Safe Handling and Use**

Steps to Be Taken in Case Material is Released or Spilled  
Normal clean-up procedures. Care should be taken to avoid causing dust to become airborne. Vacuum cleaning systems are recommended.

Waste Disposal Method  
Disposal must be made in accordance with Federal, State and Local regulations.

Precautions to Be Taken in Handling and Storing  
Store away from incompatible substances.

Other Precautions  
None

**Section VIII — Control Measures**

Respiratory Protection (Specify Type)			
Ventilation	Dust filter mask.		
	Local Exhaust	To maintain TLV's and PEL's	Special
	Mechanical (General)	To maintain TLV's and PEL's	Other
			NA

Protective Gloves	Leather or Rubber	Eye Protection	Well fitted goggles
Other Protective Clothing or Equipment	Long sleeves and pants		

Work/Hygiene Practices  
Maintain exposure limits below TLV's and PEL's, if not, use respiratory protection.



**Sauget Landfill Site G  
Sauget, IL**

**TOTAL QUANTITIES OF CONTAMINANTS  
DETECTED IN THE PONDED WATER**

CONTAMINANT	CONCENTRATION (UNIT)	TOTAL QUANTITY*	REPORTABLE QUANTITY*
Acetone	120 ug/l	0.063	1.0
dichlorophenol	20 ug/l	0.011	1.0
2, nitroaniline	180 ug/l	0.940	1.0
diethylphthlate	13 ug/l	0.068	1.0
Chloride (f)	11 mg/l	58.9	1000.0
Flouride (f)	.23 mg/l	1.2	100.00
Phenols	0.05 mg/l	0.026	1.0
T.D.S	290 mg/l	1552.8	
Sulfate	50 mg/l	267.7	
Arsenic	0.0045 mg/l	0.022	1.0
Copper	0.061 mg/l	0.320	1.0
Iron	2.15 mg/l	11.5	
Manganese	0.907 mg/l	4.9	
Mercury	0.0004 mg/l	0.002	1.0
Zinc	0.213 mg/l	1.10	1000.0
Lead	0.006 mg/l	0.032	1.0

## ASSUMPTIONS AND CONVERSION FACTORS USED

- \* Total amount of ponded water is approximately 3.1 million gallons.
- \* Rate of daily discharge is 900,000 gallon per day (gpm), or 1,500 gpm.
- \* For X reported in mg/l concentrations, the total quantity of contaminant X is calculated by the following formula:

$$\text{Quantity (kg)} = \frac{\text{mg}}{\ell} \times \frac{1 \times 10^{-6} \text{ kg}}{1 \text{ mg}} \times \frac{1 \ell}{0.26417 \text{ gallons}}$$

- \* For X reported in ug/l concentrations, the total quantity of contaminant X is calculated by the following formula:

$$\text{Quantity (kg)} = \frac{\mu\text{g}}{\ell} \times \frac{1 \times 10^{-9} \text{ kg}}{1 \mu\text{g}} \times \frac{1 \ell}{0.26417 \text{ gallons}}$$

- \*  $\text{One pound} = 0.455 \text{ kg}$



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107204  
5/94

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MONSANTO COMPANY

ATTN: BARBARA RASCHE/R3B  
MSDS COORDINATOR/SAFETY & HEALTH  
800 N LINDBERG BOULEVARD  
ST LOUIS MO 63141-7843

DATE: 05/04/94  
CUST#: 326224  
PO#: B002401

PAGE 1

# M A T E R I A L   S A F E T Y   D A T A   S H E E T

SECTION 1. ----- CHEMICAL IDENTIFICATION -----  
PRODUCT #: 29326-1      NAME: 4-METHYL-2-PENTANONE, 99.5+%, HPLC GRADE

SECTION 2. ----- COMPOSITION/INFORMATION ON INGREDIENTS -----  
CAS #: 108-10-1  
MF: C<sub>6</sub>H<sub>12</sub>O  
SYNONYMS  
HEXON (CZECH) \* HEXONE \* HEXONE (OSHA) \* ISOBUTYL-METHYLKETONE (CZECH)  
\* ISOBUTYL METHYL KETONE \* ISOPROPYLACETONE \* KETONE, ISOBUTYL METHYL  
\* METHYL-ISOBUTYL-CEONE (FRENCH) \* METHYLISOBUTYLKETONE (DUTCH,  
GERMAN) \* METHYL ISOBUTYL KETONE \* METHYL ISOBUTYL KETONE (ACGIH, DOT,  
OSHA) \* METYLIZOBUTYLOKETON (POLISH) \* 4-METHYL-2-PENTAN-2-ON (DUTCH,  
GERMAN) \* 2-METHYL-4-PENTANONE \* 4-METHYL-2-PENTANON (CZECH) \* 4-  
METHYL-2-PENTANONE \* METILISOBUTYLCHETONE (ITALIAN) \* 4-METILPENTAN-2-  
ONE (ITALIAN) \* MIBK \* MIBK \* RCRA WASTE NUMBER U161 \* SHELL MIBK \*  
UN1245 (DOT) \*

SECTION 3. ----- HAZARDS IDENTIFICATION -----  
LABEL PRECAUTIONARY STATEMENTS  
FLAMMABLE (USA DEFINITION)  
HIGHLY FLAMMABLE (EUROPEAN DEFINITION)  
HARMFUL  
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.  
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.  
TARGET ORGAN(S):  
NERVES  
KEEP AWAY FROM SOURCES OF IGNITION. NO SMOKING.  
TAKE PRECAUTIONARY MEASURES AGAINST STATIC DISCHARGES.  
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF  
WATER AND SEEK MEDICAL ADVICE.  
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE  
PROTECTION.

SECTION 4. ----- FIRST-AID MEASURES -----  
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS  
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED  
CONTINUED ON NEXT PAGE

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PRODUCT #: 293261  
MF: C6H12O

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CUST#: 326224  
PO#: R002401

CLOTHING AND SHOES.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.  
CALL A PHYSICIAN.  
REMOVE AND WASH CONTAMINATED CLOTHING PROMPTLY.

SECTION 5. - - - - - FIRE FIGHTING MEASURES - - - - -

EXTINGUISHING MEDIA  
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.  
WATER MAY BE EFFECTIVE FOR COOLING, BUT MAY NOT EFFECT EXTINGUISHMENT.  
SPECIAL FIRE FIGHTING PROCEDURES  
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.  
FLAMMABLE.  
USE WATER SPRAY TO COOL FIRE-EXPOSED CONTAINERS.  
UNUSUAL FIRE AND EXPLOSIONS HAZARDS  
VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION AND FLASH BACK.  
CONTAINER EXPLOSION MAY OCCUR UNDER FIRE CONDITIONS.  
FORMS EXPLOSIVE MIXTURES IN AIR.

SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES - - - - -

EVACUATE AREA.  
SHUT OFF ALL SOURCES OF IGNITION.  
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.  
COVER WITH AN ACTIVATED CARBON ADSORBENT, TAKE UP AND PLACE IN CLOSED CONTAINERS. TRANSPORT OUTDOORS.  
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - HANDLING AND STORAGE - - - - -  
REFER TO SECTION 8.

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION - - - - -

CONTINUED ON NEXT PAGE

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- SI WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.  
MECHANICAL EXHAUST REQUIRED.  
SAFETY SHOWER AND EYE BATH.  
USE NONSPARKING TOOLS.  
DO NOT BREATHE VAPOR.  
SI AVOID CONTACT WITH EYES, SKIN AND CLOTHING.  
WASH THOROUGHLY AFTER HANDLING.  
HARMFUL LIQUID.  
SI IRRITANT.  
KEEP TIGHTLY CLOSED.  
KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.  
STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -

APPEARANCE AND ODOR

COLORLESS LIQUID

BOILING POINT: 117 C TO 118 C

MELTING POINT: -80 C

FLASHPOINT 56 F

13C

AUTOIGNITION TEMPERATURE: 858 F

UPPER EXPLOSION LEVEL: 8% 93 C 458C

LOWER EXPLOSION LEVEL: 1.2% 93 C

VAPOR PRESSURE: 15MM 20 C

VAPOR DENSITY: 3.5

SPECIFIC GRAVITY: 0.801

SECTION 10. - - - - - STABILITY AND REACTIVITY - - - - -

INCOMPATIBILITIES

OXIDIZING AGENTS

REDUCING AGENTS

STRONG BASES

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:

CARBON MONOXIDE, CARBON DIOXIDE

CONTINUED ON NEXT PAGE

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PAGE 4

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CUST#: 326224

PO#: 8002401

SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -

ACUTE EFFECTS

MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.  
VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER

RESPIRATORY TRACT.  
CAUSES SKIN IRRITATION.

TARGET ORGAN(S):

CENTRAL NERVOUS SYSTEM

RTECS NO: SA9275000  
2-PENTANONE, 4-METHYL-

IRRITATION DATA

EYE-HMN 200 PPM/15M

SKN-RBT 500 MG/24H MLD

EYE-RBT 40 MG SEV

EYE-RBT 500 MG/24H MLD

JIHTAB 28,262,46

85JCAE -,284,86

UCDS\*\* 4/25/58

85JCAE -,284,86

TOXICITY DATA

ORL-RAT LD50:2080 MG/KG

IPR-RAT LD50:400 MG/KG

ORL-MUS LD50:2671 MG/KG

IHL-MUS LC50:23300 MG/M3

IPR-MUS LD50:268 MG/KG

SKN-RBT LD50:20 GM/KG

ORL-GPG LD50:1600 MG/KG

IPR-GPG LD50:800 MG/KG

UNR-MAH LD50:1396 MG/KG

UCDS\*\* 4/25/58

38MKAJ 2C,4748,82

TOLEDS 30,13,86

GTPZAB 17(11),52,73

SCCUR\* -,7,61

UCDS\*\* 4,25,58

38MKAJ 2C,4748,82

38MKAJ 2C,4748,82

GISAAA 51(5),61,86

TARGET ORGAN DATA

EFFECTS ON EMBRYO OR FETUS (FETOTOXICITY)

SPECIFIC DEVELOPMENTAL ABNORMALITIES (MUSCULOSKELETAL SYSTEM)

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES

(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR

COMPLETE INFORMATION.

SECTION 12. - - - - - ECOLOGICAL INFORMATION - - - - -

DATA NOT YET AVAILABLE.

SECTION 13. - - - - - DISPOSAL CONSIDERATIONS - - - - -

CONTINUED ON NEXT PAGE

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BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER BUT EXERT EXTRA CARE IN IGNITING AS THIS MATERIAL IS HIGHLY FLAMMABLE.  
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - TRANSPORT INFORMATION - - - - -  
CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - REGULATORY INFORMATION - - - - -

REVIEWS, STANDARDS, AND REGULATIONS  
ACGIH TLV-TWA 50 PPM; STEL 75 PPM 85INA8 5,402,86  
EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION  
FEREAC 54,7740,89  
MSHA STANDARD-AIR: TWA 100 PPM (410 MG/M3)  
DTLVS\* 3,126,71  
OSHA PEL: 8H TWA 100 PPM (410 MG/M3)  
FEREAC 54,2923,89  
OSHA PEL FINAL: 8H TWA 50 PPM (205 MG/M3); STEL 75 PPM (300 MG/M3)  
FEREAC 54,2923,89  
NIOSH REL TO METHYL ISOBUTYL KETONE-AIR: 10H TWA 50 PPM; STEL 75 PPM  
NIOSH\* DHHS #92-100,92  
NOHS 1974: HZD 37510; NIS 258; TNF 42735; NOS 149; TNE 435266  
NOES 1983: HZD 37510; NIS 253; TNF 47027; NOS 150; TNE 612921; TFE 110397  
EPA TSCA CHEMICAL INVENTORY, JUNE 1993  
EPA TSCA 8(A) PRELIMINARY ASSESSMENT INFORMATION, FINAL RULE  
FEREAC 47,26992,82  
ON EPA IRIS DATABASE  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, SEPTEMBER 1993/  
NIOSH ANALYTICAL METHODS: SEE KETONES I (DESORPTION IN CS2) 1300  
THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

SECTION 16. - - - - - OTHER INFORMATION - - - - -

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 6

PRODUCT #: 293261  
MF: C6H12O

NAME: 4-METHYL-2-PENTANONE, 99.5+%, HPLC GRADE

CUST#: 326224  
PO#: 8002401

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# Monsanto MATERIAL SAFETY DATA

MONSANTO COMPANY  
INFORMATION CENTER Page 1 of 6

CREVE COEUR

MONSANTO PRODUCT NAME

**TOLUENE**

MONSANTO COMPANY  
800 N. LINDBERGH BLVD.  
ST. LOUIS, MO 63167

**Emergency Phone No.**  
**(Call Collect)**  
**314-694-1000**

## PRODUCT IDENTIFICATION

**Chemical Name:** Methyl benzene  
**Synonym:** Tolulol  
**CAS No.:** 108-88-3  
**DOT Proper Shipping Name:** Toluene  
**DOT Hazard Class/I.D. No.:** Flammable Liquid/UN 1294  
**DOT Label:** Flammable Liquid  
**U.S. Surface Freight Classification:** Toluene  
**Reportable Quantity (RQ)**  
**(40 CFR Part 117)**  
**Under Clean Water Act Regulations:** 1,000 lb.

This substance is identified as a hazardous chemical under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200):

## WARNING STATEMENTS

WARNING!  
FLAMMABLE  
CAUSES IRRITATION TO EYES, SKIN AND RESPIRATORY TRACT

## PRECAUTIONARY MEASURES

Keep away from heat, sparks and flame.  
Avoid contact with eyes, skin and clothing.  
Avoid breathing vapor or mist.  
Keep container closed.  
Use with adequate ventilation.  
Wash thoroughly after handling.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed. DO NOT CUT OR WELD ON OR NEAR THIS CONTAINER.

## EMERGENCY AND FIRST AID PROCEDURES

**FIRST AID:** IF IN EYES, immediately flush with plenty water for at least 15 minutes. Call a physician.

IF ON SKIN, immediately flush with plenty of water. Remove contaminated clothing. Wash clothing before reuse.

IF INHALED, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

**IN CASE OF:**

**FIRE** use water spray, foam, dry chemical or CO<sub>2</sub>.

**SPILL OR LEAK** absorb with non-combustible commercial absorbing material. Flush area with water spray. Keep out of sewers, watersheds and water systems (see "Spill, Leak & Disposal Information" section).

103874

MATERIAL SAFETY DATA

TOLUENE

103874

## OCCUPATIONAL CONTROL PROCEDURES

**Eye Protection:** Wear chemical goggles and have eye baths available where there is significant potential for eye contact.

**Skin Protection:** Wear appropriate chemical resistant gloves and clothing to prevent skin contact. Consult glove manufacturer to determine appropriate type glove for given application. Wear chemical goggles, a full face shield and a chemical resistant apron when splashing is likely. Wash immediately if skin is contaminated. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

**Respiratory Protection:** Avoid breathing vapor and/or mist. Use NIOSH/MSHA approved equipment when airborne exposure limits (see below) are exceeded. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical goggles. Consult respirator manufacturer to determine appropriate type equipment for given application. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. Respiratory protection programs must be in compliance with 29 CFR 1910.134.

**Ventilation:** Provide sufficient ventilation to control exposure levels below airborne exposure limits (see below). Dilution ventilation is acceptable, but local mechanical exhaust ventilation is preferred at sources of air contamination such as open process equipment. Consult NFPA Standard 91 for design of exhaust system.

**Airborne Exposure Limits:** Product: Toluene  
 OSHA PEL/8-hour Time-weighted average: 200 ppm  
 Ceiling: 300 ppm  
 Peak: 500 ppm  
 ACGIH TLV/8-hour Time-weighted average: 100 ppm  
 Short-term Exposure Limit: 150 ppm

## FIRE PROTECTION INFORMATION

**Flash Point:** 40°F/4.4°C **Method:** Tag Closed Cup

**Ignition Temperature:** 997°F

**Flammable Limits % by volume in air:** 1.3% Lower  
 7.0% Upper

**Extinguishing Media:** Water spray, foam, carbon dioxide, dry chemical or any Class B extinguishing agent.

**Special Firefighting Procedures:** Firefighters and others exposed to products of combustion (see "Hazardous Decomposition Products", below) should wear full protective clothing including self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

**Unusual Fire and Explosion Hazards:** Closed containers may build up pressure when heated. Use water spray to cool containers.

## REACTIVITY DATA

<b>Stability:</b>	Stable
<b>Materials To Avoid:</b>	Acids or oxidizing materials.
<b>Hazardous Decomposition Products:</b>	Carbon monoxide, carbon dioxide, low molecular weight hydrocarbons, soot and smoke.
<b>Hazardous Polymerization:</b>	Does not occur.

## HEALTH EFFECTS SUMMARY

The following information presents both human experience and the results of scientific experiments used by qualified experts to assess the effects of toluene on the health of industrially exposed individuals and to support the Precautionary Measures and Occupational Control Procedures recommended in this document. To avoid misunderstanding, the data provided in this section should be interpreted by individuals trained in evaluation of this type of information.

### Human Experience

Dermal contact and inhalation are expected to be the primary routes of occupational exposure to toluene. Toluene is readily absorbed by inhalation and ingestion, and to a lesser degree through skin and mucous membranes. The liquid, when splashed into the eyes, may produce corneal opacity unless it is removed promptly. Dermatitis may result from repeated or sustained contact due to toluene's drying and defatting action on the skin. Toluene has narcotic-like properties similar to that of other hydrocarbon solvents. Exposure at concentrations in excess of the TLV for toluene may cause headache, drowsiness and fatigue. At concentrations between 200 and 500 ppm, impairment of coordination, momentary loss of memory and anorexia were present.

Between 500 and 1,500 ppm, palpitation, extreme weakness, pronounced loss of coordination and impairment of reaction time were noted. However, accidental exposure of humans at concentrations estimated to be between 3,000 and 5,000 ppm has occurred without fatality indicating that toluene has a low acute lethality. Long-term, repeated exposures to toluene may produce headache, giddiness, insomnia and nervous irritability. Anorexia, nausea and vomiting may be observed, accompanied by a pronounced intolerance for alcohol. Nose bleeds and cardiac pain may occur with significant overexposure. Intentional exposures to toluene by inhalation ("glue-sniffing") have led to neurological damage, including diffuse cerebral and cerebellar atrophy.

### Toxicological Data

Data from Monsanto studies and from the available scientific literature indicate the following:

Oral LD<sub>50</sub> (Rat): 5,640 mg/kg, Practically Nontoxic  
Dermal LD<sub>50</sub> (Rabbit): >10,000 mg/kg, Practically Nontoxic  
Eye Irritation (Rabbit): 11.7 on a scale of 110.0, Slightly Irritating  
Skin Irritation (Rabbit): 1.13 on a scale of 8.0, Slightly Irritating

In a 4 week oral toxicity study, rats were fed diets containing 4,640, 10,000 and 21,500 ppm toluene. Dark and spotted livers, pale kidneys and mild irritation of the small intestine were observed at all levels, but were more pronounced at the 21,500 ppm level.

A 90 day subacute inhalation toxicity study was conducted with toluene using 5 groups of 30 rats exposed to either 0, 30, 100, 300 or 1,000 ppm of the test material for 6 hours per day, 5 days per week for 13 weeks. No treatment related adverse effects and no gross or histopathological tissue changes were observed.

(Health Effects Summary Continued On The Next Page)

## HEALTH EFFECTS SUMMARY (Continued)

No treatment related tumors were observed in 3 limited bioassay studies in which mice received topical applications of toluene at dosages of either 6.5 mg 3 times weekly for their lifetime, or 13.9-17.3 mg three times weekly for 72 weeks, or 5.2 mg twice weekly for 50 weeks. Also, toluene applied to the ears of mice at a dosage of 86.6 mg twice a week for 19 to 20 weeks did not have significant tumor promoting activity in mice pretreated with methyl-benz[a]-anthracene.

In a chronic inhalation study, rats were exposed to atmospheric concentrations of 30, 100 or 300 ppm toluene for 6 hours per day, 5 days per week for 24 months. No adverse chronic toxic or carcinogenic effects were observed. The no-effect level was 300 ppm.

Groups of young rats were exposed to toluene at atmospheric concentrations of 400, 700, 1,000, 2,000 and 3,000 ppm to evaluate the ototoxic potential of this material. Hearing loss was observed in animals after exposure to 1,000 ppm of toluene 14 hours per day for 2 weeks. Exposure to toluene at concentrations of 1,500 ppm for 14 hours per day, or 2,000 ppm for 8 hours per day for 3 days also had an adverse effect on hearing. Hearing loss was also detected in animals exposed to toluene at a concentration of 3,000 ppm for 30 minutes every hour, 8 hours per day for 2 weeks. However, hearing was not affected in those rats exposed to toluene at concentrations of 400 and 700 ppm 14 hours per day for up to 16 weeks.

No teratogenic, fetotoxic, or maternal toxic effects were observed in rats exposed to toluene at atmospheric concentrations of 100 and 400 ppm on days 6 through 15 of gestation.

Groups of pregnant rats were exposed to toluene at concentrations of 1,500 mg/m<sup>3</sup> continuously on gestation days 1 through 8; 1,500 mg/m<sup>3</sup> continuously on days 9 through 14 of gestation; or 1,000 mg/m<sup>3</sup> for 8 hours per day on gestation days 1 through 21. Reduced fetal weights and fetal growth rates were observed in those animals dosed on gestation days 1 through 8. An increased incidence of retarded skeletal development (fused sternebrae and extra ribs) was observed in those animals exposed on gestation days 9 through 14 and 1 through 21. Toluene was not considered to be teratogenic under the conditions of exposure in this study.

The mutagenic and genotoxic potential of toluene has been evaluated extensively. The results from microbial mutagenicity assays utilizing up to 5 strains of *Salmonella* and one yeast strain have been uniformly negative.

*In vivo* rat bone marrow cell clastogenesis assays have resulted in both positive and negative results. However, two of the studies that reported positive results are questionable because of small numbers of animals in the treatment groups, use of a single dose level and the absence of data for the evaluation of the results of the studies.

No mutagenic effects were observed when toluene was evaluated in the L5178Y TK mouse lymphoma assay.

Toluene was reported not to be mutagenic in a mouse dominant lethal assay in which groups of male mice were exposed to atmospheric concentrations of 100 or 400 ppm toluene 6 hours per day, 5 days per week for 8 weeks. Negative results were reported in *in vitro* chromosome aberration assays and sister chromatid exchange assays using human lymphocytes treated with toluene at concentrations of 15.2, 152 and 1,520 µg/ml.

### Additional Information

A Threshold Limit Value (TLV) has been established by the American Conference of Governmental Industrial Hygienists for toluene. For further information on this material, please refer to the current edition of the *Documentation of Threshold Limit Values*.

## PHYSICAL DATA

<b>Appearance:</b>	Colorless liquid
<b>Odor:</b>	Aromatic, benzene
<b>Boiling Point:</b>	231°F
<b>Vapor Pressure @ 77°F:</b>	28 mm Hg
<b>Vapor Density (Air = 1):</b>	3.1
<b>Liquid Density (H<sub>2</sub>O = 1):</b>	0.866
<b>Percent Volatile:</b>	100 by vol.
<b>Evaporation Rate (ether °1):</b>	<1
<b>Solubility:</b>	Essentially insoluble in water

**Note:** These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

## SPILL, LEAK & DISPOSAL INFORMATION

**Waste Disposal:** Toluene is a "hazardous waste" as that term is defined in 40 CFR 261, "Identification and Listing of Hazardous Waste", because of its characteristic of ignitability. Disposal via incineration is recommended. Disposal should be in accordance with all applicable local, state and federal laws and regulations. Consult your attorney or appropriate regulatory officials for information on such disposal.

### Spill or Leakage Procedures:

Only protected personnel should remain in the area. Take up with sand or other non-combustible absorbent material and place into containers for later disposal. Flush with water spray. Provisions must be made to prevent toluene spills from entering public sewers or drains in sufficient amounts to cause explosion hazards. Keep out of sewers, watersheds and water systems. Use of foam will contain vapors.

For further information refer to DOT Emergency Response Guidebook, Guide #27.

FOR EMERGENCY ASSISTANCE CALL MONSANTO/CHEMTREC  
800 424-9300.

## ADDITIONAL COMMENTS

### Other Precautions:

Use explosion proof tools. No smoking allowed. Ground all tanks, drums, equipment, etc. to eliminate static charges. Never use air pressure for toluene transfer.

# Monsanto MATERIAL SAFETY DATA

Page 6 of 6

**DATE:** 2/86

**SUPERSEDES:** 10/84

**MSDS NO.:** 000108883

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

Manager, Product Safety  
Monsanto Chemical Company  
An operating unit of Monsanto Company  
(314) 694-1000

MATERIAL SAFETY DATA TOLUENE

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# Monsanto MATERIAL SAFETY DATA

MATERIAL SAFETY DATA

TOLUENE

# Monsanto MATERIAL SAFETY DATA

MATERIAL SAFETY DATA TOLUENE



NOTE: THIS PRODUCT WAS DISCONTINUED 1981

12-1-89

Form Approved  
Budget Bureau No. 44-R1387  
Approval Expires April 30, 1971

# U.S. DEPARTMENT OF LABOR

WORKPLACE STANDARDS ADMINISTRATION  
Bureau of Labor Standards



## MATERIAL SAFETY DATA SHEET

99-73

SECTION I	
MANUFACTURER'S NAME <b>Monsanto Company</b>	EMERGENCY TELEPHONE NO. <b>(713) 581-2161, Alvin, Texas</b>
ADDRESS (Number, Street, City, State, and ZIP Code) <b>800 N. Lindbergh Boulevard, St. Louis, Missouri 63166</b>	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS <b>Meta/Para-Xylene</b>
CHEMICAL FAMILY <b>Aromatic Hydrocarbon</b>	FORMULA <b>C<sub>6</sub>H<sub>4</sub> (CH<sub>3</sub>)<sub>2</sub></b>

SECTION II HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

SECTION III PHYSICAL DATA			
BOILING POINT (°F.)	281	SPECIFIC GRAVITY (H <sub>2</sub> O = 1)	0.86
VAPOR PRESSURE (mm Hg.)	50	PERCENT VOLATILE BY VOLUME (%)	100
VAPOR DENSITY (AIR = 1)	3.7	EVAPORATION RATE (Butyl- = 1)	<1
SOLUBILITY IN WATER	Neg.	acetate	
APPEARANCE AND ODOR <b>Clear, Aromatic</b>			

SECTION IV FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (Method used) <b>77°F (Closed Cup)</b>	FLAMMABLE LIMITS	LEL <b>1.1%</b>	UEL <b>7.0%</b>
EXTINGUISHING MEDIA <b>Dry Chemical, CO<sub>2</sub>, Foam, Water</b>			
SPECIAL FIRE FIGHTING PROCEDURES <b>Isolate area, contain the fire, cool equipment, protect exposures, avoid breathing vapors from the fire.</b>			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

104007

## SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	100 ppm
EFFECTS OF OVEREXPOSURE	Central nervous system depression, headache and confusion. Loss of consciousness in extreme cases.
EMERGENCY AND FIRST AID PROCEDURES	Remove to fresh air, call a physician, use artificial respiration if necessary. Keep patient warm and comfortable.

## SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	Yes	
INCOMPATIBILITY (Materials to avoid)			
HAZARDOUS DECOMPOSITION PRODUCTS CO, CO <sub>2</sub>			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	Yes	

## SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	Normal clean-up operation - remove ignition sources.
WASTE DISPOSAL METHOD	

## SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)		
Canister gas mask for <2% in air, air mask for >2% in air.		
VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General)	OTHER
PROTECTIVE GLOVES	Rubber	EYE PROTECTION
OTHER PROTECTIVE EQUIPMENT		Goggles or face shield.

## SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	Keep away from ignition sources or heat. Store in closed container.
OTHER PRECAUTIONS	Avoid skin and eye contact. Avoid inhalation of vapors.

NOTE: THIS PRODUCT WAS DISCONTINUED 1981

12-1-89

Form Approved  
Budget Bureau No. 44-R1387  
Approval Expires April 30, 1971



# U.S. DEPARTMENT OF LABOR

WORKPLACE STANDARDS ADMINISTRATION

Bureau of Labor Standards

## MATERIAL SAFETY DATA SHEET

99-99

SECTION I	
MANUFACTURER'S NAME <b>Monsanto Company</b>	EMERGENCY TELEPHONE NO. <b>(713) 581-2161, Alvin, Texas</b>
ADDRESS (Number, Street, City, State, and ZIP Code) <b>800 N. Lindbergh Boulevard, St. Louis, Missouri 63166</b>	
CHEMICAL NAME AND SYNONYMS <b>Ortho-Xylene - Xylol, dimethylbenzene</b>	TRADE NAME AND SYNONYMS <b>Ortho-Xylene, Xylol</b>
CHEMICAL FAMILY <b>Aromatic</b>	FORMULA <b>C<sub>6</sub>H<sub>4</sub> (CH<sub>3</sub>)<sub>2</sub></b>

SECTION II HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

SECTION III PHYSICAL DATA			
BOILING POINT (°F.)	302	SPECIFIC GRAVITY (H <sub>2</sub> O = 1)	0.864
VAPOR PRESSURE (mm Hg.)	19.48	PERCENT VOLATILE BY VOLUME (%)	100%
VAPOR DENSITY (AIR = 1)	3.7	EVAPORATION RATE (Ethyl Ether)	<1
SOLUBILITY IN WATER	Neg.		
APPEARANCE AND ODOR <b>Clear colorless liquid - characteristic aromatic odor.</b>			

SECTION IV FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (Method used) <b>80.6°F - Closed Cup</b>	FLAMMABLE LIMITS	LEL <b>1.1</b>	UEL <b>7.0</b>
EXTINGUISHING MEDIA <b>CO<sub>2</sub>, Dry Chemical, Vaporizing Liquids and Foam Extinguishers</b>			
SPECIAL FIRE FIGHTING PROCEDURES <b>Isolate area, contain the fire, cool equipment, protect exposures, avoid breathing vapors caused by fire.</b>			
UNUSUAL FIRE AND EXPLOSION HAZARDS <b>None</b>			

104008

## SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	100 ppm
EFFECTS OF OVEREXPOSURE	Central nervous system depression, headache, confusion and morbid sensations. Extreme cases may result in loss of consciousness.
EMERGENCY AND FIRST AID PROCEDURES	Remove person overcome by o-xylene to an uncontaminated atmosphere and call a physician. Use artificial respiration if necessary. Keep patient warm and comfortable.

## SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	Yes	
INCOMPATIBILITY (Materials to avoid)			
HAZARDOUS DECOMPOSITION PRODUCTS CO, CO <sub>2</sub>			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	Yes	

## SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	Normal clean-up operations, remove ignition sources.
WASTE DISPOSAL METHOD	

## SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)		
Industrial canister type gas masks for <2% o-xylene in air - Air masks for >2% o-xylene		
VENTILATION	LOCAL EXHAUST For o-xylene at high temp. or in open equipment.	SPECIAL
	MECHANICAL (General) Generally sufficient.	OTHER
PROTECTIVE GLOVES	Rubber	EYE PROTECTION Goggles or face shield.
OTHER PROTECTIVE EQUIPMENT		

## SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	Keep away from ignition sources or heat. Should be stored in closed containers.
OTHER PRECAUTIONS	Avoid skin and eye contact. Avoid inhalation of vapors.

MONSANTO PRODUCT NAME

**ETHYLBENZENE**

MONSANTO COMPANY  
800 N. LINDBERGH BLVD.  
ST. LOUIS, MO 63167

**Emergency Phone No.**  
(Call Collect)  
314-694-1000

## PRODUCT IDENTIFICATION

**Chemical Name:** Ethylbenzene

**Synonyms:** Phenylethane, EB

**Chemical Formula:** C<sub>8</sub>H<sub>10</sub>

**Chemical Family:** Aromatic Hydrocarbons

**CAS No.:** 100-41-4

**DOT Proper Shipping Name:** Ethylbenzene

**DOT Hazard Class/I.D. No.:** Flammable Liquid/UN1175

**DOT Label:** Flammable Liquid

**U.S. Surface Freight Classification:** Ethylbenzene

**Reportable Quantity (RQ)**  
(40 CFR Part 117):  
**Under Clean Water Act Regulations:** 1,000 lbs.

MONSANTO COMPANY  
INFORMATION CENTER  
CREVE COEUR

This substance is identified as a hazardous chemical under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

## WARNING STATEMENTS

WARNING!  
FLAMMABLE  
CAUSES IRRITATION TO EYES, SKIN AND RESPIRATORY TRACT

## PRECAUTIONARY MEASURES

Keep away from heat, sparks and flame.  
Avoid contact with eyes, skin and clothing.  
Avoid breathing mist or vapor.  
Keep container closed.  
Use with adequate ventilation.  
Wash thoroughly after handling.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed. DO NOT CUT OR WELD ON OR NEAR THIS CONTAINER. DO NOT INCINERATE CONTAINERS.

112115

MATERIAL SAFETY DATA

ETHYLBENZENE

112115

## EMERGENCY AND FIRST AID PROCEDURES

**FIRST AID:** IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Call a physician.  
IF ON SKIN, immediately flush with plenty of water. Remove contaminated clothing. Wash clothing before reuse.

IF INHALED, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

### IN CASE OF:

**FIRE**, use water spray, foam, dry chemical or CO<sub>2</sub>. Cool containers exposed to fire with water (see "Fire Protection Information" section).

**SPILL or LEAK**, keep people away and upwind. Shut off leak if this can be done without risk. If necessary to enter spill area, wear self-contained breathing apparatus and full protective clothing including boots. Dike to confine liquid spilled material. Absorb spilled material with commercial absorbing material. Sweep up or shovel into dry, clean containers. Keep out of sewers, watersheds and waterways. (see "Spill, Leak & Disposal Information" section).

## OCCUPATIONAL CONTROL PROCEDURES

**Eye Protection:** Wear chemical splash goggles and have eye baths available at locations where there is significant potential for eye contact.

**Skin Protection:** Wear appropriate protective gloves that provide a barrier and protective clothing to prevent skin contact. Consult glove manufacturer to determine appropriate type glove for given application. Wear a face shield and an apron that provides a barrier when splashing is likely. Wash contaminated skin promptly. Launder contaminated clothing and clean protective equipment before reuse. Wash thoroughly after handling.

**Respiratory Protection:** Avoid breathing vapor and/or mist. Use NIOSH/MSHA approved equipment when airborne exposure limits (see below) are exceeded. Consult respirator manufacturer to determine appropriate type equipment for given application. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. High airborne concentrations may require use of self-contained breathing apparatus or supplied air respirator. Respiratory protection programs must be in compliance with 29 CFR 1910.134.

**Ventilation:** Provide sufficient ventilation to control exposure levels below airborne exposure limits (see below). Use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult NFPA Standard 91 for design of exhaust system.

**Airborne Exposure Limits:** Product: Ethylbenzene  
OSHA PEL/8-hour Time-weighted average: 100 ppm  
ACGIH TLV/8-hour Time-weighted average: 100 ppm  
Short-term Exposure Limit: 125 ppm

## FIRE PROTECTION INFORMATION

**Flash Point:** 59°F **Method:** Tag Closed Cup

**Ignition Temperature:** 810°F

**Flammable Limits % by volume in air:** Upper 1.0%  
Lower 6.7%

**Extinguishing Media:** Water spray, foam, dry chemical, carbon dioxide or any Class B extinguishing agent.

(Fire Protection Information Continued On The Next Page)

## FIRE PROTECTION INFORMATION (Continued)

### **Special Firefighting Procedures:**

Firefighters and others exposed to products of combustion (see "Hazardous Decomposition Products", below) should wear full protective clothing including self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

### **Unusual Fire and Explosion Hazards:**

There is a possibility of pressure build-up in closed containers when heated. Use water spray to cool containers exposed to fire.

## REACTIVITY DATA

**Materials To Avoid:** Strong oxidizers, oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Does not occur.

## HEALTH EFFECTS SUMMARY

The following information presents both human experience and the results of scientific experiments used by qualified experts to assess the effects of ethylbenzene on the health of industrially exposed individuals and to support the Precautionary Measures and Occupational Control Procedures recommended in this document. To avoid misunderstanding, the data provided in this section should be interpreted by individuals trained in evaluation of this type of information.

### **Human Experience**

Dermal contact and inhalation are expected to be the primary routes of occupational exposure to ethylbenzene. Occupational exposure to this material has been reported to cause mild to moderate irritation to the eyes, skin and respiratory tract. However, prolonged skin contact may cause tissue damage. Exposure to high vapor concentration may cause eye irritation and lacrimation. Ethylbenzene possesses narcotic-like properties; excessive exposure to ethylbenzene by inhalation may cause fatigue, sleepiness, incoordination, headache, dizziness and other central nervous system effects.

### **Toxicological Data**

Data from Monsanto's studies and from the available scientific literature indicate the following:

Oral LD<sub>50</sub> (Rat): 4,000 mg/kg, Slightly Toxic

Dermal LD<sub>50</sub> (Rabbit): >7,940 mg/kg, Practically Nontoxic

Eye Irritation (Rabbit): (FHSA) 7.4 on a scale of 110.0, Slightly Irritating

Skin Irritation (Rabbit): (FHSA) 5.1 on a scale of 8.0, Severely Irritating

Vapor Inhalation (Rat): 1 out of 6 rats died during exposure and 1 rat died during the 14 day observation period after a 6 hour exposure to 30.2 mg/liter.

Ethylbenzene was evaluated for sensitization potential in humans using a maximization assay. Twenty-five human volunteers received repeated applications of 10% ethylbenzene in petrolatum following pretreatment with sodium lauryl sulfate. No sensitization reactions were observed in the test subjects.

Rats, rabbits, guinea pigs and monkeys were exposed to 400 to 2,200 ppm ethylbenzene vapor for 8 hours per day, 5 days per week for 6 months. Histopathological changes in the liver, kidneys and testes were observed at high concentrations. At 400 ppm, only slight increases in liver and kidney weights in rats were observed. Guinea pigs, rabbits and monkeys were not affected at the lowest level.

(Health Effects Summary Continued On The Next Page)

## HEALTH EFFECTS SUMMARY (Continued)

In a 6 month oral study, female rats were given ethylbenzene by stomach tube at 13.6, 136, 408 and 680 mg/kg/day. At 408 and 680 mg/kg, slight histopathological changes were observed in the liver and kidney. The no-effect level was 136 mg/kg.

Ethylbenzene was evaluated in an inhalation study in which 4 groups of 80 male rats were exposed to concentrations of 0, 50, 300 or 600 ppm of the test material 6 hours per day, 5 days per week for either 2, 5, 9 or 16 weeks. Increased kidney weights were observed in the high dose groups. Reduced body weight gains were observed in those animals exposed to 600 ppm for 16 weeks. Histopathological changes in the liver were observed in all dose groups and exposure periods.

A teratology study was conducted using rats and rabbits exposed to ethylbenzene at concentrations of 100 or 1,000 ppm for 6 to 7 hours per day on gestation days 1 through 19 (rats) and 1 through 24 (rabbits). Maternal toxicity in rats exposed to 1,000 ppm was observed as increased liver, kidney and spleen weights. An increase in the incidence of extra ribs was observed among fetuses in both groups of rats. Increase in extra ribs by themselves does not constitute a teratogenic response. The number of live births per litter was reduced at both exposure levels in rabbits; however, the number of implantations per litter and the number of dead or reabsorbed fetuses per litter did not differ from the controls.

Rats were exposed to 100 and 1,000 ppm of ethylbenzene 7 hours per day, 5 days per week for 3 weeks, then mated and exposed to the test material through the 19th day of gestation. Artificially inseminated rabbits were exposed to ethylbenzene at concentrations of 100 and 1,000 ppm 7 hours per day, 5 days per week through day 24 of gestation. No maternally toxic or embryotoxic effects were observed in rabbits. Maternal toxicity, observed as increased liver, kidney and spleen weights, was noted for rats of the high exposure group. No evidence of teratogenicity was observed in rats.

Ethylbenzene is absorbed primarily through the respiratory system, although skin absorption may occur at a low rate. The major metabolites found in the urine of men exposed to atmospheric concentrations of ethylbenzene were mandelic and phenylglyoxylic acids. Mandelic acid was the major urinary metabolite found in humans following dermal applications. Phenaceturic acid, mandelic acid, p-hydroxyacetophenone, m-hydroxyacetophenone, 2-hydroxyacetophenone, hippuric acid and 1-phenylethanol were the major urinary metabolites found following gastrointestinal absorption of ethylbenzene by humans.

### Additional Information

A Threshold Limit Values (TLV) has been established by the American Conference of Governmental Industrial Hygienists for ethylbenzene. For further information on this material, please refer to the current issue of the *Documentation of Threshold Limit Values*.

## PHYSICAL DATA

<b>Appearance:</b>	Colorless liquid
<b>Odor:</b>	Aromatic
<b>Boiling Point:</b>	136°C
<b>Melting Point:</b>	-95°C
<b>Solubility in Water, % by wt.:</b>	0.002 @ 80°F/27°C
<b>Specific Gravity @ 20°/4°C:</b>	0.86
<b>Vapor Pressure (mm Hg):</b>	10 @ 79°F/26°C
<b>Vapor Density (Air = 1):</b>	3.7

**Note:** These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.



## SPILL, LEAK & DISPOSAL INFORMATION

**Waste disposal:**

Ethylbenzene is a "hazardous waste" as that term is defined in 40 CFR 261, "Identification and Listing of Hazardous Waste", because of its characteristic of ignitability. Disposal via incineration is recommended. Appropriate pretreatment and disposal in an authorized landfill is acceptable. In all cases, disposal should be in accordance with all applicable local, state and federal laws and regulations. Consult your attorney or appropriate regulatory officials for information on such disposal.

**Containers:**

Discard in an authorized landfill in accordance with all applicable local, state and federal laws and regulations. DO NOT INCINERATE CONTAINERS.

**Spill or Leakage  
Procedures:**

Keep people away and upwind from the spill or leak. Shut off, extinguish or remove all sources of ignition, spark, flame and hot surfaces. Shut off the leak, if this can be done without risk. Insure adequate ventilation. If it is necessary that persons enter the spill area, they must wear a self-contained breathing apparatus and full protective clothing, including boots. Keep this material out of sewers, watersheds and water systems. Dike and pump spilled material into a salvage tank or absorb spilled material with commercial absorbing material. Use water spray to knock down vapors. If it is not possible to dike spilled material or keep it out of watersheds and waterways, flush with water and notify pollution control authorities. Run-off to sewers may create health or explosion hazards; notify fire, health and pollution control authorities. To dispose of spilled material follow suggestions given under "Waste Disposal" above.

For further information refer to DOT Emergency Response Guidebook, Guide #26.

FOR EMERGENCY ASSISTANCE CALL MONSANTO/CHEMTREC  
800 424-9300.

## ADDITIONAL COMMENTS

**Environmental Toxicity Information:**

96-hr LC<sub>50</sub> Bluegill sunfish: 150 mg/l, Practically Nontoxic

96-hr LC<sub>50</sub> Sheepshead minnow: 280 mg/l, Practically Nontoxic

**DATE:** 3/86

**SUPERSEDES:** 8/84

**MSDS NO.:** 000100414

**FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:**

Manager, Product Safety  
Monsanto Chemical Company  
An operating unit of Monsanto Company  
314-694-1000

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, Monsanto Company makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Monsanto Company be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

# Monsanto MATERIAL SAFETY DATA

MATERIAL SAFETY DATA ETHYLBENZENE

# **Monsanto** MATERIAL SAFETY DATA

MATERIAL SAFETY DATA

ETHYLBENZENE

# Monsanto MATERIAL SAFETY DATA

ETHYLBENZENE

MATERIAL SAFETY DATA



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MONSANTO COMPANY  
RESEARCH ACCOUNTS PAYABLE/02K  
800 N LINDBURGH BLVD  
ST LOUIS MO 63167

M A T E R I A L   S A F E T Y   D A T A   S H E E T  
CUST # 325902 P.O. # 0012617

DATE: 03/20/86

PAGE: 1

SECTION I   PRODUCT IDENTIFICATION

13184-9   1,2,3,4-TETRACHLOROBENZENE, 98%  
CAS # 634-66-2  
MOLECULAR FORMULA: C<sub>6</sub>H<sub>2</sub>CL<sub>4</sub>

SECTION II   TOXICITY HAZARDS

RTECS # DB9440000  
BENZENE, 1,2,3,4-TETRACHLORO-

ORL-RAT LD50: 1167 MG/KG JTEHD6 11,663,83  
"NIOSH MANUAL OF ANALYTICAL METHODS" VOL 7 343 NIMAM\*  
"NIOSH MANUAL OF ANALYTICAL METHODS" TO BE REVISED BY JUNE, 1985  
REPORTED IN EPA TSCA INVENTORY, 1983  
EPA TSCA 8(A) PRELIMINARY ASSESSMENT INFORMATION, FINAL RULE FEREAC  
47,26992,82  
MEETS CRITERIA FOR PROPOSED OSHA MEDICAL RECORDS RULE FEREAC 47,30420,  
82

SECTION III   PHYSICAL DATA

MELTING POINT: 46 C TO 47 C  
BOILING POINT: 254 C/761MM.

SECTION IV   FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: >235 F

EXTINGUISHING MEDIA:

WATER SPRAY,  
CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.

SPECIAL FIRE FIGHTING PROCEDURES:

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO  
PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION V   HEALTH HAZARD DATA

MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.  
CAUSES EYE AND SKIN IRRITATION.  
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER  
RESPIRATORY TRACT.

TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND  
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

FIRST AID:

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF  
WATER FOR AT LEAST 15 MINUTES.

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Telex 26-843

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F-67 000 Strasbourg  
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Japan

Aldrich Japan  
c/o Kyodo Bldg. Shinkanda  
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Chiyoda-Ku, Tokyo  
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United Kingdom

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DATE: 03/20/86 CATALOG # 13184-9 CUST # 325902 P.O. # 0012617

PAGE: 2

IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS AMOUNTS OF WATER.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION, PREFERABLY MOUTH-TO-MOUTH. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
CALL A PHYSICIAN.  
WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION VI   REACTIVITY DATA

**INCOMPATIBILITY:**

STRONG OXIDIZING AGENTS  
STRONG BASES

**HAZARDOUS DECOMPOSITION PRODUCTS:**

TOXIC FUMES OF:  
CARBON MONOXIDE, CARBON DIOXIDE  
HYDROGEN CHLORIDE GAS

SECTION VII   SPILL OR LEAK PROCEDURES

**SPILLS OR LEAKS:**

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.  
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.  
AVOID RAISING DUST.  
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

**WASTE DISPOSAL:**

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

SECTION VIII   PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

CHEMICAL SAFETY GOGGLES.  
RUBBER GLOVES  
OSHA/MSHA-APPROVED RESPIRATOR.  
SAFETY SHOWER AND EYE BATH.  
MECHANICAL EXHAUST REQUIRED.  
AVOID CONTACT AND INHALATION.  
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.  
WASH THOROUGHLY AFTER HANDLING.  
IRRITANT.  
KEEP TIGHTLY CLOSED.  
STORE IN A COOL DRY PLACE.

SECTION IX   SPECIAL PRECAUTIONS AND COMMENTS

NOT APPLICABLE

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ALDRICH SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL TERMS AND CONDITIONS OF SALE.

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MONSANTO COMPANY  
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ST LOUIS MO 63167

M A T E R I A L   S A F E T Y   D A T A   S H E E T  
CUST # 325902 P.C. # 0012617

DATE: 03/20/86

PAGE: 1

SECTION I   PRODUCT IDENTIFICATION

13185-7   1,2,4,5-TETRACHLOROBENZENE, 98%  
CAS # 95-94-3  
MOLECULAR FORMULA: C<sub>6</sub>H<sub>2</sub>CL<sub>4</sub>

SECTION II   TOXICITY HAZARDS

RTECS # DB9450000  
BENZENE, 1,2,4,5-TETRACHLORO-

ORL-RAT LD50:1500 MG/KG HYSAAV 30,8,65  
ORL-MUS LD50:1035 MG/KG HYSAAV 30,8,65  
NTP CARCINOGENESIS STUDIES; SELECTED, APRIL 1985  
"NIOASH MANUAL OF ANALYTICAL METHODS" VOL 7 343 NIMAM\*  
"NIOASH MANUAL OF ANALYTICAL METHODS" TO BE REVISED BY JUNE, 1985  
REPORTED IN EPA TSCA INVENTORY, 1983  
EPA TSCA 8(A) PRELIMINARY ASSESSMENT INFORMATION, FINAL RULE FEREAC  
47,26992,82

SECTION III   PHYSICAL DATA

MELTING POINT: 138 C TO 140 C  
BOILING POINT: 240 C TO 246 C

SECTION IV   FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: >235 F

EXTINGUISHING MEDIA:

WATER SPRAY,  
CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.

SPECIAL FIRE FIGHTING PROCEDURES:

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO  
PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION V   HEALTH HAZARD DATA

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TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

FIRST AID:

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF  
WATER FOR AT LEAST 15 MINUTES.

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DATE: 03/20/86 CATALOG # 13185-7 CUST # 325902 P.O. # 0012617

PAGE: 2

IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS AMOUNTS OF WATER.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION, PREFERABLY MOUTH-TO-MOUTH. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
CALL A PHYSICIAN.  
WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION VI    REACTIVITY DATA

**INCOMPATIBILITY:**

STRONG OXIDIZING AGENTS  
STRONG BASES

**HAZARDOUS DECOMPOSITION PRODUCTS:**

TOXIC FUMES OF:  
CARBON MONOXIDE, CARBON DIOXIDE  
HYDROGEN CHLORIDE GAS

SECTION VII    SPILL OR LEAK PROCEDURES

**SPILLS OR LEAKS:**

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.  
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.  
AVOID RAISING DUST.  
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

**WASTE DISPOSAL:**

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OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

SECTION VIII    PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

CHEMICAL SAFETY GOGGLES.  
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OSHA/MSHA-APPROVED RESPIRATOR.  
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MECHANICAL EXHAUST REQUIRED.  
AVOID CONTACT AND INHALATION.  
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.  
WASH THOROUGHLY AFTER HANDLING.  
IRRITANT.  
KEEP TIGHTLY CLOSED.  
STORE IN A COOL DRY PLACE.

SECTION IX    SPECIAL PRECAUTIONS AND COMMENTS

NOT APPLICABLE

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c/o Kyodo Bldg. Shinkanda  
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**West Germany**

Aldrich-Chemie GmbH & Co. KG  
D-7924 Steinheim  
West Germany



PER NAME HAZARD. THIS IS NOT A HAZARDOUS PRODUCT.

PREPARED AND UPDATED 12-1-79

**MONSANTO COMPANY**  
**INFORMATION CENTER**  
CREVE COEUR

Form No. G-2489  
May 1969

Form Approved  
Budget Bureau No. 44-R1387  
Approval Expires April 30, 1971

# U.S. DEPARTMENT OF LABOR

WORKPLACE STANDARDS ADMINISTRATION

Bureau of Labor Standards

## MATERIAL SAFETY DATA SHEET

### SECTION I

MANUFACTURER'S NAME <b>Monsanto Company</b>		EMERGENCY TELEPHONE NO. <b>(713) 581-2161, Alvin, Texas</b>
ADDRESS (Number, Street, City, State, and ZIP Code) <b>800 N. Lindbergh Boulevard, St. Louis, Missouri 63166</b>		
CHEMICAL NAME AND SYNONYMS <b>Benzene, Phenylhydride, Cyclohexatriene</b>		TRADE NAME AND SYNONYMS <b>Benzene, Benzol</b>
CHEMICAL FAMILY <b>Aromatic Hydrocarbon</b>	FORMULA <b>C<sub>6</sub>H<sub>6</sub></b>	

### SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

### SECTION III PHYSICAL DATA

BOILING POINT (°F.)	176	SPECIFIC GRAVITY (H <sub>2</sub> O = 1) (20/4, °C)	0.8794
VAPOR PRESSURE (mm Hg.)	75.1	PERCENT VOLATILE BY VOLUME (%)	100
VAPOR DENSITY (AIR = 1)	2.70	EVAPORATION RATE (____ = 1)	Unknown
SOLUBILITY IN WATER	Negligible		
APPEARANCE AND ODOR	Clear and colorless, characteristic aromatic odor.		

### SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) <b>12°F (Closed Cup)</b>	FLAMMABLE LIMITS	LEL <b>1.4%</b>	UEL <b>8.0%</b>
EXTINGUISHING MEDIA	<b>Foam, CO<sub>2</sub>, Dry Chemical, Water Spray</b>		
SPECIAL FIRE FIGHTING PROCEDURES	<b>Isolate area, contain the fire, cool equipment, use necessary protective equipment and breathing apparatus for hazardous combustion products</b>		
UNUSUAL FIRE AND EXPLOSION HAZARDS	<b>Highly flammable and its vapors form explosive mixtures with air.</b>		

## SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE 25 ppm

## EFFECTS OF OVEREXPOSURE

Dizziness, excitation, and pallor, followed by flushing, weakness, headache, breathlessness, chest constriction. Coma and possible death.

## EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure and call physician. Keep warm, quiet, and in recumbent position. If breathing has stopped, start artificial respiration at once. Flush from skin with water followed by soap &amp; water, flush from eyes with copious quantities of water.

## SECTION VI REACTIVITY DATA

## STABILITY

UNSTABLE

STABLE

## CONDITIONS TO AVOID

Will react by chlorination, nitration, sulfonation, and alkylation.

X

## INCOMPATIBILITY (Materials to avoid)

## HAZARDOUS DECOMPOSITION PRODUCTS

CO, CO<sub>2</sub>HAZARDOUS  
POLYMERIZATION

MAY OCCUR

WILL NOT OCCUR

## CONDITIONS TO AVOID

X

## SECTION VII SPILL OR LEAK PROCEDURES

## STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Normal clean up operations, remove ignition sources, avoid breathing vapors, flush with water.

## WASTE DISPOSAL METHOD

Remove to safe location, then pour on dry sand or earth and then cautiously ignite. Do not permit benzene to enter drains or sewers where there might be danger of vapors becoming ignited.

## SECTION VIII SPECIAL PROTECTION INFORMATION

## RESPIRATORY PROTECTION (Specify type)

Use breathing air for high vapor concentrations.

## VENTILATION

## LOCAL EXHAUST

Normal ventilation

MECHANICAL (General)

## SPECIAL

Eliminate ignition sources

OTHER

## PROTECTIVE GLOVES

Impervious gloves or protective cream.

## EYE PROTECTION

Safety glasses or goggles.

## OTHER PROTECTIVE EQUIPMENT

cream.

## SECTION IX SPECIAL PRECAUTIONS

## PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep away from ignition or heat sources. Should be stored in closed containers.

## OTHER PRECAUTIONS

Avoid skin and eye contact, avoid inhalation of vapors.

MONSANTO PRODUCT NAME

**SANTOCHLOR®  
PARA-DICHLOROBENZENE**10/92  
**MONSANTO COMPANY  
800 NO. LINDBERGH BLVD.  
ST. LOUIS, MO 63167**

**FOR CHEMICAL EMERGENCY, SPILL LEAK, FIRE, EXPOSURE, OR ACCIDENT**  
Call CHEMTREC - Day or Night - 1-800-424-9300 Toll free in the continental U.S., Hawaii, Puerto Rico, Canada, Alaska, or Virgin Islands. For calls originating elsewhere: 202-483-7616 (collect calls accepted)

For additional non-emergency information, call: 314-694-2333

## PRODUCT IDENTIFICATION

Synonym(s):	1,4-dichlorobenzene, PDCB
Chemical Name:	1,4-dichlorobenzene
Chemical Formula:	C <sub>6</sub> H <sub>4</sub> Cl <sub>2</sub>
Chemical Family:	Chlorinated Aromatic
CAS No.:	106-46-7
TSCA Inventory:	1,4-dichlorobenzene (para-Dichlorobenzene) appears on the Inventory of Chemical Substances published by the U.S. Environmental Protection Agency (EPA) under authority of the Toxic Substances Control Act (TSCA).
EPA Pesticide Registration Numbers:	Santochlor Molten: 524-281 Santochlor Crushed: 524-283 Santochlor 20: 524-283
DOT Proper Shipping Name:	Para-Dichlorobenzene
DOT Hazard Class/I.D. No./ Packing Group:	6.1 Poisonous Materials/UN1592/PGIII
DOT Label(s):	Keep Away From Food
U.S. Surface Freight Classification:	Dye Intermediates, N.O.I.B.N.
Reportable Quantity (RQ) Under U.S. EPA CERCLA Regulations:	Para Dichlorobenzene, 100 lbs. (45.4 kg)
SARA Hazard Notification	
Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370):	Immediate, Delayed, Fire

122822

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**PRODUCT IDENTIFICATION - CONTINUED**

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**Section 313 Toxic Chemical(s):**

This product contains the following substance(s) which are defined as toxic chemicals under, and subject to the reporting requirements of, Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

<u>Toxic Chemical Name</u>	<u>Chemical Abstract Service Registry Number</u>	<u>Percent by Weight in Product</u>
para-Dichlorobenzene	106-46-7	99.4-100.0%

**Hazardous Chemical(s) Under OSHA Hazard Communication Standard:**

This product is identified as a hazardous chemical under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

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**WARNING STATEMENTS**

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Keep out of reach of children.

**WARNING:**

**CAUSES IRRITATION TO EYES, SKIN AND RESPIRATORY TRACT IRRITATION  
HARMFUL IF SWALLOWED**

**HOT MATERIAL CAN CAUSE THERMAL BURNS (For SANTOCHLOR Molten only)  
COMBUSTIBLE VAPOR AND LIQUID.**

**EXCESSIVE EXPOSURE MAY CAUSE LIVER AND KIDNEY DAMAGE**

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**PRECAUTIONARY MEASURES**

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Do not get in eyes, on skin, or on clothing.

Avoid breathing dust or vapors, or spray mist.

Use with adequate ventilation.

Avoid contact with hot liquid. (For SANTOCHLOR Molten only)

Wash thoroughly with soap and water after handling.

Do not use or store near heat or open flame.

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**EMERGENCY AND FIRST AID PROCEDURES**

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**FIRST AID: IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Call a physician.**

**IF ON SKIN, immediately flush with plenty of water. Remove contaminated clothing. Wash clothing before reuse. In the case of contact with hot liquid, treat for thermal effects.**

**IF INHALED, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.**

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**PRECAUTIONARY MEASURES - CONTINUED**

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**IF SWALLOWED**, induce vomiting immediately by giving two glasses of water and sticking finger down throat. Call a physician. **NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.** Remove material from eyes, skin and clothing.

**IN CASE OF SPILL**, sweep up or shovel into clean metal containers. Dispose of pesticide and container in accordance with instructions in spill, leak and disposal section of MSDS.

**IN CASE OF FIRE**, extinguish with water spray, foam CO<sub>2</sub>, dry chemical or any Class B extinguishing agent.

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**OCCUPATIONAL CONTROL PROCEDURES**

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**Eye Protection:** Where there is significant potential for eye contact, wear chemical goggles and have eye flushing equipment available.

**Skin Protection:** Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove for given application. Wear face shield and chemical resistant clothing such as a rubber apron when splashing is likely. Wash contaminated skin promptly. Launder contaminated clothing and clean protective equipment before reuse. Wash thoroughly after handling.

**Respiratory Protection:** Avoid breathing vapor, mist or dust. Use NIOSH/MSHA approved respiratory protection equipment (full facepiece recommended) when airborne exposure limits are exceeded (see below). If used, full facepiece replaces need for face shield and/or chemical goggles. Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer. Respiratory protection programs must comply with 29 C.F.R. § 1910.134.

**Ventilation:** Provide ventilation to control exposure levels below airborne exposure limits. Use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult NFPA Standard 91 for design of exhaust systems.

**Airborne Exposure Limits:**

para-Dichlorobenzene (99.4 - 100% by wt. of product)

OSHA PEL:	75 ppm 8-Hour TWA; 110 ppm short term exposure limit
ACGIH TLV:	75 ppm 8-Hour TWA; 110 ppm short term exposure limit

**NOTE:** The National Toxicology Program finding of tumors in laboratory animals was not available when these airborne exposure limits were set for para-Dichlorobenzene by OSHA and ACGIH.

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**FIRE PROTECTION INFORMATION**

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**Combustible solid or liquid.**

**Flash Point:** 150°F (66°C) **Method:** Cleveland Open Cup

**Extinguishing Media:** Water spray, foam, CO<sub>2</sub>, dry chemical or any Class B extinguishing agent.

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## **FIRE PROTECTION INFORMATION - CONTINUED**

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**Special Firefighting Procedures:** Wear full protective clothing and self-contained breathing apparatus where exposure to vapor or gases is possible. Firefighting equipment should be thoroughly decontaminated after use.

**Unusual Fire and Explosion Hazards:** None

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## **REACTIVITY DATA**

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**Stability:** Product is stable under ordinary conditions of storage and handling.

**Materials to Avoid:** Strong oxidizers, oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), smoke, soot, chlorides and chlorine.

**Hazardous Polymerization:** Does not occur.

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## **HEALTH EFFECTS SUMMARY**

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The following information summarizes human experience and results of scientific investigations reviewed by health professionals for hazard evaluation of para-dichlorobenzene and development of Precautionary Statements and Occupational Control Procedures recommended in this document.

### **Effects of Exposure**

Inhalation and skin contact are expected to be the primary routes of occupational exposure to para-dichlorobenzene (PDCB). Eye contact with PDCB has been reported to produce pain in the eyes, but has not been reported to cause serious injury to the eyes. This material produces a burning sensation when held in contact with skin, though injury to the skin is minimal. Minor eye and nasal irritation have been reported with exposure to PDCB in air at concentrations as low as 50 ppm. Exposure to PDCB above recommended airborne exposure limits may result in headache, swelling around the eyes, inflammation of the mucous membranes of the nose, loss of appetite, nausea and vomiting. Though composition data was limited, several reports in the literature indicate jaundice and liver toxicity as a result of overexposure. Toxicity studies indicate high doses of PDCB produce liver and kidney injury in laboratory animals.

### **Toxicological Data**

Data from laboratory studies conducted by Monsanto and from the scientific literature on PDCB are summarized below.

Single exposure (acute) studies indicate:

Oral -	Slightly Toxic	(Rat LD50 3,826 mg/kg) Category III
Dermal -	Practically Nontoxic	(Rabbit LD50 >5,010 mg/kg) Category IV
Vapor Inhalation -	Practically Nontoxic	(Rat 4-hr LC50 >6.0 mg/l)
Eye Irritation -	Severe Irritation, clearing in 13 days	(Rabbit) Category I
Skin Irritation -	Slightly Irritating	(Rabbit, 4-hr exposure, 2.9/8.0) Category III

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**HEALTH EFFECTS SUMMARY - CONTINUED**

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Repeated inhalation studies (up to 14 weeks) with PDCB, conducted in rats, rabbits, guinea pigs and dogs, have resulted in liver and kidney toxicity, lung effects, reversible eye changes (rabbits only), reduced body weights and number of white blood cells, clinical signs and animal deaths at high exposure levels, while no effects were reported in mice or monkeys. No adverse effects were observed in rats following repeated skin exposure (3-weeks) to PDCB. In repeat oral dosing studies (4 to 31 weeks), rodents given PDCB exhibited changes in body weight, some organ weights and clinical parameters, porphyria and kidney damage (male rats only) with liver toxicity. Changes in bone marrow, spleen, thymus and nasal turbinates were also observed in rats at dosages which produced some deaths.

No birth defects were noted in rats given PDCB orally during pregnancy, even at amounts which produced adverse effects on the mothers and their offspring. Exposure of pregnant rats and rabbits to PDCB by inhalation produced no increase in treatment-related birth defects. No effects were seen on the ability of male or female rats to reproduce when exposed to PDCB by inhalation for 2 successive generations; kidney toxicity (male rat only) and liver toxicity with reductions in body weight and pup survival during days 0-4 of nursing were observed.

PDCB has generally produced no genetic changes in a variety of standard tests using animals and animal or bacterial cells. A positive response was reported in one assay using animals and mixed responses were reported in another assay using animal cells. PDCB has been shown to bind to nucleic acids in mouse organs, but not to bind to nucleic acids in rat organs, and to increase cell replication in male rat kidneys.

**Cancer Studies**

Long-term inhalation exposure of rodents (57 and 76 weeks for rats and mice, respectively) did not produce an increase in tumors; liver and kidney weights and urine coproporphyrin were increased at the highest exposure level. In long-term oral dosing studies with rats and mice (2-year) conducted by the National Toxicology Program (NTP), reduced survival and body weights with tumors of the kidney (male rat only) and liver (male and female mice), as well as kidney damage in rat and changes in mouse liver, thyroid and adrenal gland were observed. Mechanistic data suggest that PDCB produces kidney tumors via a special mechanism unique to the male rat. These data show hyaline droplet kidney toxicity in the male rat only. This toxic response is considered to result from reaction of PDCB and/or its metabolite (2,5-dichlorophenol) with alpha-2μ-globulin, a protein unique to the male rat (not found in female rats, mice or humans). The mechanism of male rat kidney tumor formation is considered to be secondary to the interaction of PDCB and alpha-2μ-globulin.

As a consequence of the NTP studies, PDCB is listed as a substance that "may reasonably be anticipated to be" carcinogenic by NTP in their Annual Report on Carcinogens and is classified as "possibly carcinogenic to humans" by the International Agency for Research on Cancer (IARC Monographs, Vol. 29). The NTP and IARC listings are based on their determination that there is inadequate evidence for the carcinogenicity of PDCB in humans and sufficient evidence for the carcinogenicity of PDCB in experimental animals.

These listings are based exclusively on studies which found kidney tumors in male rats and liver tumors in male and female mice. There is a large body of scientific evidence beyond these studies which conclusively demonstrates the tumor findings have only minimal relevance to humans. Many regulatory and advisory groups throughout the world, such as the US Environmental Protection Agency (EPA), the US Consumer Product Safety Commission (CPSC), and the World Health Organization's International Program for Chemical Safety (IPCS), have reached this conclusion after comprehensive review of the entire body of scientific evidence addressing the health effects of PDCB. EPA, for example, rejected a proposal to classify PDCB as a "probable" human carcinogen and decided that the less restrictive "possible" classification was warranted. CPSC more recently concluded that PDCB products should not be treated as "toxic" or "hazardous" products under federal law.

para-Dichlorobenzene is also listed as a carcinogen under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).

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**HEALTH EFFECTS SUMMARY - CONTINUED**

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**Additional Information**

Excretion of dichlorophenol, a metabolite of PDCB, in urine of workers has occurred after exposure to PDCB. The presence of dichlorophenol in the urine is revealed by its distinctive odor. Prolonged exposure to PDCB produces a noticeable odor in urine of workers.

A Threshold Limit Value (TLV) has been established by the American Conference of Governmental Industrial Hygienists for PDCB (para-dichlorobenzene). For further information on this material, please refer to the current edition of the Documentation of the Threshold Limit Values and Biological Indices.

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**PHYSICAL DATA**

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<b>Appearance:</b>	<b>White crystals; penetrating "mothball odor"</b>
<b>Boiling Point:</b>	<b>174°C (345.2°F)</b>
<b>Melting Point:</b>	<b>53°C (127.4°F)</b>
<b>Specific Gravity @ 20/4°C:</b>	<b>1.458</b>
<b>Solubility in Water @ 25°C, % by wt.:</b>	<b>0.008</b>
<b>Vapor Pressure @ 20°C (68°F):</b>	<b>0.6 mm Hg</b>
<b>Vapor Density (Air = 1):</b>	<b>5.1</b>

**NOTE:** These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

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**SPILL, LEAK, & DISPOSAL INFORMATION**

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**Emergency Spill and Leak Information:** Keep people away. Shut off or extinguish all sources of ignition. Shut off leak if without risk. Small spills, keep upwind. Large spills, evacuate area. If necessary to enter spill area, wear self-contained breathing apparatus and full protective clothing including boots. Sweep up or shovel into clean metal containers. Run-off to sewers may create health and explosion hazards; notify fire, health and pollution control authorities.

Release of more than 100 pounds to the environment in a 24-hour period requires notification of the National Response Center, 1-800-424-8802. Notification of state authorities may also be required.

**Disposal Information:** This product can become a hazardous waste as designated by the Environmental Protection Agency under the authority of the Resource Conservation and Recovery Act (RCRA). Product (or waste) has RCRA Hazardous Waste Number U072 as designated in 40 CFR 261.33. This material is subject to the RCRA Land Disposal Restriction of 40 CFR 268. Disposal by incineration is Best Available Demonstrated Treatment (BDAT). All federal, state, and local regulations should be followed in disposing of this substance.



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## SPILL, LEAK, & DISPOSAL INFORMATION - CONTINUED

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**Pesticide Disposal:** Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to directions for use, contact your state pesticide or Environmental Control Agency or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

### Container Disposal:

**Bags:** Completely empty bag into application equipment and dispose of empty bag in a sanitary landfill or by incineration. Emptied container retains vapor and product residue. Observe all labeled safeguards until container is destroyed.

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## ENVIRONMENTAL EFFECTS

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### Environmental Toxicity Information:

Oral LD50 Bobwhite quail:	1,608 mg/kg, Slightly Toxic
48-hr EC50 <i>Daphnia magna</i> :	7.4 mg/l, Moderately Toxic
96-hr LC50 Fathead minnow:	4.2-30 mg/l, Moderately Toxic
96-hr LC50 Grass shrimp:	60 mg/l, Slightly Toxic

Fathead minnow eggs were exposed to PDCB at concentrations of 0, 0.57, 1.0, 2.0, 4.1 and 8.7 mg/l. Fry did not survive the 32-day exposure at 2.0 mg/l and higher. Survival and weight of the fry was reduced at 1.0 mg/l.

PDCB was evaluated in a 24-hour semi-continuous activated sludge (SCAS) test and in the Thompson-Duthie-Sturm biodegradability assay. Primary degradation was greater than 95% in the SCAS test. Theoretical CO<sub>2</sub> evolution was approximately 58% using the Thompson-Duthie-Sturm method. PDCB was intermediate to readily biodegradable in both assays.

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Santochlor® is a registered trademark of Monsanto Company.

DATE: 10/15/92

SUPERSEDES: 2/12/91

MSDS NUMBER 000106467

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EMERGENCY PHONE 1-314-771-5765

DATE: 01/26/94  
CUST#: 6-049-57832  
PO#: 1036X

M A T E R I A L   S A F E T Y   D A T A   S H E E T   P A G E   1

SECTION 1. - - - - - CHEMICAL IDENTIFICATION - - - - -

PRODUCT #: P1045      NAME: PENTACHLOROPHENOL

SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - -

CAS #: 87-86-5  
MF: C6H5Cl5O1

(page 4 RTECS)

SYNONYMS

ACUTOX \* CHEM-PENTA \* CHEM-TOL \* CHLOROPHEN \* CRYPTOGLIL OL \* DOWCIDE  
7 \* DOWCIDE 7 \* DOWCIDE EC-7 \* DOWCIDE G \* DOW PENTACHLOROPHENOL  
DP-2 \* ANTIMICROBIAL \* DURETOX \* EP 30 \* FUNGIFEN \* GLAZD PENTA \*  
GRUNDFER ARBEZOL \* 1-HYDROXY-PENTACHLOROBENZENE \* LAUTOL \* LAUTOL A \*  
LIPDOPHEM \* NCI-C54933 \* NCI-C55378 \* NCI-C56655 \* PCP \* PENCHLOROL \*  
PENTA \* PENTACHLOROPHENOL (DUTCH) \* PENTACHLOROPHENOL \*  
PENTACHLOROPHENOL (ITALIAN) \* PENTACHLOROPHENATE \* PENTACHLOROPHENOL \*  
2,3,4,5,6-PENTACHLOROPHENOL \* PENTACHLOROPHENOL (ACGIH, OSHA) \*  
PENTACHLOROPHENOL, DOWCIDE EC-7 \* PENTACHLOROPHENOL, DP-2 \*  
PENTACHLOROPHENOL (GERMAN) \* PENTACHLOROPHENOL, TECHNICAL \* PENTACEN \*  
PENTA-KIL \* PENTA READY \* PENTASOL \* PENTA WR \* PENWAR \* PERATOX \*  
PERMACE \* PERMAGARD \* PERHASAN \* PERMATOX DP-2 \* PERMATOX PENTA \*  
PERMITE \* PREVENCL \* PRILTCX \* RCRA WASTE NUMBER U242 \* SANTOBRITE \*  
SANTOPHEN 20 \* SINITUHC \* TERM-I-TROL \* THOMPSON'S WOOD FIX \* WEEODNE  
\* WITHPHEN P \*

SECTION 3. - - - - - HAZARDS IDENTIFICATION - - - - -

LABEL PRECAUTIONARY STATEMENTS

HIGHLY TOXIC (USA DEFINITION)  
TOXIC (EUROPEAN DEFINITION)  
MAY CAUSE CANCER.  
MAY CAUSE HERITABLE GENETIC DAMAGE.  
TOXIC BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.  
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.  
POSSIBLE TERATOGEN.  
READILY ABSORBED THROUGH SKIN.  
TARGET ORGAN(S):  
LIVER  
KIDNEYS  
IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW THE LABEL WHERE  
POSSIBLE).

SECTION 4. - - - - - FIRST-AID MEASURES - - - - -

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T                      P A G E   2

CUST#: 6-049-57832  
PO#: 1036X

PRODUCT #: P1045  
MF: C5H1CL5O1

NAME: PENTACHLOROPHENOL

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.  
WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION 5. - - - - - FIRE FIGHTING MEASURES - - - - -

EXTINGUISHING MEDIA

WATER SPRAY.

CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES - - - - -

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.

SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.

AVOID RAISING DUST.

VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - HANDLING AND STORAGE - - - - -  
REFER TO SECTION 8.

ADDITIONAL INFORMATION

MAY BE CONTAMINATED WITH A MIXTURE OF POLYCHLOROBENZODIOXINS.

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION - - - - -

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T                      P A G E   3

PRODUCT #: P1045  
MF: C6H1CL5O1

NAME: PENTACHLOROPHENOL

CUST#: 6-049-57832  
PJ#: 1036X

GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.  
SAFETY SHOWER AND EYE BATH.  
USE ONLY IN A CHEMICAL FUME HOOD.  
DO NOT BREATHE DUST.  
AVOID CONTACT WITH EYES, SKIN AND CLOTHING.  
AVOID PROLONGED OR REPEATED EXPOSURE.  
READILY ABSORBED THROUGH SKIN.  
WASH THOROUGHLY AFTER HANDLING.  
HIGHLY TOXIC.  
IRRITANT.  
POSSIBLE TERATOGEN.  
MUTAGEN.  
CARCINOGEN.  
KEEP TIGHTLY CLOSED.  
STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -

APPEARANCE AND ODOUR  
OFF-WHITE POWDER  
BOILING POINT: 310 C  
MELTING POINT: 189 C TO 191 C  
VAPOR PRESSURE: 40MM 211.2 C  
VAPOR DENSITY: 9.2  
SPECIFIC GRAVITY: 1.978

SECTION 10. - - - - - STABILITY AND REACTIVITY - - - - -

INCOMPATIBILITIES  
STRONG OXIDIZING AGENTS  
STRONG BASES  
ACID CHLORIDES  
ACID ANHYDRIDES  
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS  
TOXIC FUMES OF:  
CARBON MONOXIDE, CARBON DIOXIDE  
HYDROGEN CHLORIDE GAS

SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -

CONTINUED ON NEXT PAGE

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## M A T E R I A L   S A F E T Y   D A T A   S H E E T PAGE 4

CUST#: 6-049-57832  
PON#: 1036X

PRODUCT #: P1045  
MF: C5H1CL5O1

NAME: PENTACHLOROPHENOL

### ACUTE EFFECTS

MAY BE FATAL IF INHALED, SWALLOWED, OR ABSORBED THROUGH SKIN.  
CAUSES EYE AND SKIN IRRITATION.  
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER  
RESPIRATORY TRACT.  
EXPOSURE CAN CAUSE:

CONVULSIONS  
DERMATITIS

### CHRONIC EFFECTS

DAMAGE TO THE LIVER  
DAMAGE TO THE KIDNEYS  
MAY CAUSE CONGENITAL MALFORMATION IN THE FETUS.  
CARCINOGEN.  
MAY ALTER GENETIC MATERIAL.

TARGET ORGAN(S):

LIVER, KIDNEYS

RTECS NO: S4630000

PHENOL, PENTACHLORO-

### IRRITATION DATA

SKN-RAT 10 MG/24H OPEN MLD

### TOXICITY DATA

URL-MAN LD50:401 MG/KG

URL-RAT LD50:27 MG/KG

URL-RAT LC50:355 MG/M3

SKN-RAT LD50:26 MG/KG

IPR-RAT LD50:56 MG/KG

SCU-RAT LD50:58 MG/KG

URL-MUS LD50:117 MG/KG

URL-MUS LC50:225 MG/M3

IPR-MUS LD50:58 MG/KG

UNK-DIG LD50:70 MG/KG

UNK-SPG LD50:100 MG/KG

URL-HAM LD50:168 MG/KG

URL-DOG LD50:380 MG/KG

UNK-FRG LD50:36 MG/KG

### TARGET ORGAN DATA

PERIPHERAL NERVE AND SENSATION (FLACCID PARALYSIS WITHOUT ANESTHESIA)

BEHAVIORAL (SOMNOLENCE)

BEHAVIORAL (CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD)

BEHAVIORAL (EXCITEMENT)

BEHAVIORAL (CHANGE IN MOTOR ACTIVITY)

BEHAVIORAL (MUSCLE WEAKNESS)

BEHAVIORAL (MUSCLE CONTRACTION OR SPASTICITY)

AIHAAP 23,95,62

EESA0V 1,343,77

JPETAB 76,104,42

GTPZAB 13(9),58,69

GTPZAB 13(9),58,69

BJPCAL 13,20,58

SRTCAC 36(1-4),10,89

TOLED5 29,39,85

GTPZAB 13(9),58,69

JTEHD6 10,699,82

PHPHA6 1,3,53

PHPHA6 1,3,53

TXAPA9 48,4192,79

DCEAAH 35,25,79

PHPHA6 1,3,53

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

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CUST#: 6-049-57832  
PON: 1036X

PRODUCT #: P1045  
MF: C6H1CL5O1

NAME: PENTACHLOROPHENOL

VASCULAR (BP ELEVATION NOT CHARACTERIZED IN AUTONOMIC SECTION)  
LUNGS, THORAX OR RESPIRATION (DYSPPNAE)  
LUNGS, THORAX OR RESPIRATION (RESPIRATORY STIMULATION)  
LUNGS, THORAX OR RESPIRATION (TUMORS)  
GASTROINTESTINAL (CHANGES IN STRUCTURE OR FUNCTION OF SALIVARY GLANDS)  
LIVER (TUMORS)  
KIDNEY, URETER, BLADDER (URINE VOLUME INCREASED)  
ENDOCRINE (HYPERGLYCEMIA)  
SKIN AND APPENDAGES (SWEATING)  
EFFECTS ON EMBRYO OR FETUS (FETOTOXICITY)  
EFFECTS ON EMBRYO OR FETUS (FETAL DEATH)  
SPECIFIC DEVELOPMENTAL ABNORMALITIES (MUSCULOSKELETAL SYSTEM)  
SPECIFIC DEVELOPMENTAL ABNORMALITIES (HOMEOSTASIS)  
NUTRITIONAL AND GROSS METABOLIC (BODY TEMPERATURE INCREASE)  
TUMORIGENIC (EQUIVOCAL TUMORIGENIC AGENT BY RTECS CRITERIA)  
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES  
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR  
COMPLETE INFORMATION.

SECTION 12. - - - - - ECOLOGICAL INFORMATION - - - - -  
DATA NOT YET AVAILABLE.

SECTION 13. - - - - - DISPOSAL CONSIDERATIONS - - - - -

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A  
CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.  
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - TRANSPORT INFORMATION - - - - -

CONTACT SIGMA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - REGULATORY INFORMATION - - - - -

REVIEWS, STANDARDS, AND REGULATIONS

ACGIH TLV-TWA 0.5 MG/M3 (SKIN)	85INAB 5,461,86
IARC CANCER REVIEW:HUMAN LIMITED EVIDENCE	IMEMDT 41,310,86
IARC CANCER REVIEW:ANIMAL SUFFICIENT EVIDENCE	IMEMDT 53,371,91
IARC CANCER REVIEW:ANIMAL INADEQUATE EVIDENCE	IMEMDT 20,303,79
IARC CANCER REVIEW:HUMAN INADEQUATE EVIDENCE	IMEMDT 53,371,91

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## M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 6

CUST#: 6-049-57832  
PN#: 1036X

PRODUCT #: P1045  
MF: C<sub>5</sub>H<sub>1</sub>Cl<sub>5</sub>O<sub>1</sub>

NAME: PENTACHLOROPHENOL

IARC CANCER REVIEW: GROUP 2B IMEMDT 53,371,91  
EPA FIFRA 1983 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION  
FEREAC 54,7740,87  
MSHA STANDARD-AIR: TWA 0.5 MG/M<sup>3</sup> (SKIN)  
DTLVS\* 3,198,71  
OSHA PEL: 8H TWA 0.5 MG/M<sup>3</sup> (SKIN)  
FEREAC 54,2923,89  
OSHA PEL FINAL: 8H TWA 0.5 MG/M<sup>3</sup> (SKIN)  
FEREAC 54,2923,89  
OEL-AUSTRALIA: TWA 0.5 MG/M<sup>3</sup>; SKIN JANUARY 1993  
OEL-BELGIUM: TWA 0.5 MG/M<sup>3</sup>; SKIN JANUARY 1993  
OEL-DENMARK: TWA 0.05 PPM (0.5 MG/M<sup>3</sup>); SKIN JANUARY 1993  
OEL-FINLAND: TWA 0.5 MG/M<sup>3</sup>; STEL 1.5 MG/M<sup>3</sup>; SKIN JANUARY 1993  
OEL-FRANCE: TWA 0.5 MG/M<sup>3</sup>; SKIN JANUARY 1993  
OEL-GERMANY: TWA 0.05 PPM (0.5 MG/M<sup>3</sup>); SKIN JANUARY 1993  
OEL-HUNGARY: TWA 0.2 MG/M<sup>3</sup>; STEL 0.4 MG/M<sup>3</sup>; SKIN JANUARY 1993  
OEL-JAPAN: TWA 0.5 MG/M<sup>3</sup>; SKIN JANUARY 1993  
OEL-THE NETHERLANDS: TWA 0.5 MG/M<sup>3</sup>; SKIN JANUARY 1993  
OEL-THE PHILIPPINES: TWA 0.5 MG/M<sup>3</sup>; SKIN JANUARY 1993  
OEL-RUSSIA: STEL 0.1 MG/M<sup>3</sup>; SKIN JANUARY 1993  
OEL-SWEDEN: TWA 0.5 MG/M<sup>3</sup>; STEL 1.5 MG/M<sup>3</sup>; SKIN JANUARY 1993  
OEL-SWITZERLAND: TWA 0.05 PPM (0.5 MG/M<sup>3</sup>); STEL 0.1 PPM (1 MG/M<sup>3</sup>); SKIN JANUARY 1993  
OEL-TURKEY: TWA 0.5 MG/M<sup>3</sup>; SKIN JANUARY 1993  
OEL-UNITED KINGDOM: TWA 0.5 MG/M<sup>3</sup>; STEL 1.5 MG/M<sup>3</sup>; SKIN JANUARY 1993  
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA, NEW ZEALAND, SINGAPORE, VIETNAM CHECK ACCIH TLV  
NIOSH REL TO PENTACHLOROPHENOL-AIR: 10H TWA 0.5 MG/M<sup>3</sup> (SK)  
NIOSH\* DHHS #92-100,92  
NDS 1974: H2O 54160; NIS 47; TNF 3548; NOS 42; TNE 29154  
NDS 1983: H2O 54160; NIS 29; TNF 2248; NOS 38; TNE 26806; TFE 4191  
ATSDR TOXICOLOGY PROFILE (NTIS\*\* PB/90/182163/AS)  
EPA GENETOX PROGRAM 1989, POSITIVE: CELL TRANSFORM.-SA7/SHE; S  
CEREVISIAE GENE CONVERSION  
EPA GENETOX PROGRAM 1989, POSITIVE: S CEREVISIAE-FORWARD MUTATION  
EPA GENETOX PROGRAM 1989, NEGATIVE: HOST-MEDIATED ASSAY; MOUSE SPOT TEST  
EPA GENETOX PROGRAM 1988, NEGATIVE: HISTIDINE REVERSION-AMES TEST; S  
CEREVISIAE-HOMOZYGOUS  
EPA TSCA CHEMICAL INVENTORY, JANUARY 1993  
ON EPA IRIS DATABASE  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, SEPTEMBER 1993  
NIOSH ANALYTICAL METHODS: SEE PENTACHLOROPHENOL 5512

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 7

CUST#: 6-049-57832  
PO#: 1036X

PRODUCT #: P1045  
MF: C6H1CL5O1

NAME: PENTACHLOROPHENOL

NIOSH ANALYTICAL METHODS: SEE PENTACHLOROPHENOL IN BLOOD 8001; IN URINE  
8303  
NTP CARCINOGENESIS STUDIES (FEED): CLEAR EVIDENCE; MOUSE  
NTP TR\* NTP-TR-349,89  
NTP CARCINOGENESIS STUDIES: ON TEST (TWO YEAR STUDIES), JANUARY 1993  
OSHA ANALYTICAL METHOD #39  
THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

SECTION 16. - - - - - OTHER INFORMATION - - - - -

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103803

9/93

MONSANTO PRODUCT NAME

PARA-NITROPHENOL

MONSANTO COMPANY  
800 NO. LINDBERGH BLVD.  
ST. LOUIS, MO 63167

**FOR CHEMICAL EMERGENCY, SPILL LEAK, FIRE, EXPOSURE, OR ACCIDENT**

Call CHEMTREC - Day or Night - 1-800-424-9300 Toll free in the continental U.S., Hawaii, Puerto Rico, Canada, Alaska, or Virgin Islands. For calls originating elsewhere: 202-483-7616 (collect calls accepted)

For additional non-emergency information, call: 314-694-2333

**PRODUCT IDENTIFICATION**

Synonym(s):	4-Hydroxynitrobenzene; 4-Nitrophenol; PNP
Chemical Name:	Phenol, 4-nitro-
Chemical Formula:	C <sub>6</sub> H <sub>5</sub> NO <sub>3</sub>
Chemical Family:	Nitrated benzene
CAS No.:	100-02-7
TSCA Inventory:	para-Nitrophenol appears on the Inventory of Chemical Substances published by the U.S. Environmental Protection Agency (EPA) under authority of the Toxic Substances Control Act (TSCA).
DOT Proper Shipping Name:	Nitrophenols
DOT Hazard Class/I.D. No./ Packing Group:	6.1 Poisonous Materials/UN1663/PG III
DOT Label:	Keep away from food.
U.S. Surface Freight Classification:	Chemicals, N.O.I.
Reportable Quantity (RQ) Under U.S. EPA CERCLA Regulations:	100 lbs. (45.4 Kg)
SARA Hazard Notification	
Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370):	Immediate, delayed

103803

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## PRODUCT IDENTIFICATION - CONTINUED

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### Section 313 Toxic Chemical(s):

This product contains the following substance(s) which are defined as toxic chemicals under, and subject to the reporting requirements of, Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

<u>Toxic Chemical Name</u>	<u>Chemical Abstract Service Registry Number</u>	<u>Percent by Weight in Product</u>
4-nitrophenol	100-02-7	99.5%

### Hazardous Chemical(s) Under OSHA Hazardous Communication Standard:

This substance is identified as a hazardous chemical under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200):

para-Nitrophenol, CAS No. 100-02-7

---

## WARNING STATEMENTS

---

### DANGER!

CAUSES BURNS TO EYES AND SKIN

MAY BE HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN; MAY CAUSE METHEMOGLOBINEMIA - A SUFFOCATING CONDITION.

---

## PRECAUTIONARY MEASURES

---

Do not get in eyes, on skin, on clothing. Wear chemical safety goggles and protective clothing.

Avoid breathing dust. Use NIOSH approved respirator if airborne dust or vapor is excessive.

Do not take internally.

Keep container closed.

Use with adequate ventilation

Wash thoroughly after handling.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is destroyed.  
DO NOT REUSE THIS CONTAINER.

---

## EMERGENCY AND FIRST AID PROCEDURES

---

FIRST AID: IF IN EYES OR ON SKIN, immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. (Destroy contaminated shoes.)

IF SWALLOWED, induce vomiting immediately by giving two glasses of water and sticking finger down throat. Call a physician. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

---

## EMERGENCY AND FIRST AID PROCEDURES - CONTINUED

---

**IF INHALED,** remove to fresh air. If not breathing give artificial respiration, preferably mouth to mouth. If breathing is difficult, give oxygen. Call a physician.

**NOTE TO PHYSICIANS:** Absorption of this product into the body may lead to the formation of methemoglobin that, in sufficient concentration, causes cyanosis. Since reversion of methemoglobin to hemoglobin occurs spontaneously, though slowly, after termination of exposure, moderate degrees of cyanosis need be treated only by supportive measures such as bed rest and oxygen inhalation. Thorough cleansing of the body, including scalp and nails, is of utmost importance to prevent continued absorption. If cyanosis is severe, intravenous injection of methylene blue, 1 milligram per kilogram of body weight, will be of value. Observe until methemoglobin level is below 20 percent.

---

## OCCUPATIONAL CONTROL PROCEDURES

---

**Eye Protection:** Wear chemical splash goggles and have eye baths immediately available where there is potential for eye contact.

**Skin Protection:** para-Nitrophenol can be absorbed through the skin causing methemoglobinemia. Care must be taken to prevent skin contact. Wear protective gloves, rubber boots, and protective long-sleeved clothing that provide a barrier when there is potential for skin contact. If handled as a liquid, wear a faceshield and protective apron that provides a barrier. Wash potentially contaminated skin immediately and thoroughly with soap and water. Launder contaminated clothing and clean protective equipment before reuse. Provide a safety shower at any location where skin contamination can occur. Wash thoroughly after handling.

**Respiratory Protection:** Avoid breathing dust. Use NIOSH/MSHA approved equipment when airborne exposure is excessive. Consult respirator manufacturer to determine appropriate type equipment for given application. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical splash goggles. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. High airborne concentrations may require use of self-contained breathing apparatus or supplied air respirator. Respiratory protection programs must be in compliance with 29 CFR 1910.134.

**Ventilation:** Provide ventilation to minimize exposure. Use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

**Airborne Exposure Limits:**

Para-Nitrophenol

OSHA PEL:	None Established
ACGIH TLV:	None Established

---

## FIRE PROTECTION INFORMATION

---

Crystalline Solid

Flash Point:	377°F	Method:	Tag Closed Cup
Melting Point:	235°F		

---

## FIRE PROTECTION INFORMATION - CONTINUED

---

**Extinguishing Media:** Water spray, or any Class A extinguishing agent. Use water spray to cool containers. If containers are damaged, flood the exposed material with water.

**Special Fire Fighting Procedures:** Fire fighters and others who may be exposed to products of combustion should wear full protective clothing including self-contained breathing apparatus. Fire fighting equipment should be thoroughly decontaminated after use.

**Unusual Fire and Explosion Hazards:** Highly toxic oxides of nitrogen are products of decomposition.

---

## REACTIVITY DATA

---

**Stability:** Stable under normal warehouse storage conditions. Store separately from combustible, organic or other readily oxidizable materials. Protect from physical damage.

**Materials to Avoid:** None

**Hazardous Decomposition Products:** Highly toxic oxides of nitrogen are emitted when para-nitrophenol is heated to decomposition temperature of 279°C (534°F).

**Hazardous Polymerization:** Does not occur.

---

## HEALTH EFFECTS SUMMARY

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The following information presents both human experience and the results of scientific experiments used by qualified experts to assess the effects of para-nitrophenol on the health of industrially exposed individuals and to support the Precautionary Statements and Occupational Control Procedures recommended in this document.

To avoid misunderstanding, the data provided in this section should be interpreted by individuals trained in evaluation of this type of information.

### Human Experience

Inhalation and dermal contact are expected to be the primary routes of occupational exposure to para-nitrophenol. para-Nitrophenol is considered to be corrosive to the eyes. Excessive exposure to para-nitrophenol dust has been reported to produce eye and nasal irritation. Prolonged dermal contact may cause injury to the skin. para-Nitrophenol is considered moderately toxic following ingestion. Although this material is considered, on the basis of acute animal tests, to be practically nontoxic following dermal contact, human experience has shown that man is much more sensitive to the production of methemoglobinemia following exposure to aromatic nitro compounds than the rat or rabbit.

Methemoglobinemia is caused by changes in the blood cells which decrease the oxygen-carrying capacity of the blood. This oxygen deficiency may lead to cyanosis. As the oxygen deficiency increases, cyanosis may be associated with headache, weakness, irritability, drowsiness, shortness of breath, and unconsciousness. The appearance of methemoglobinemia may be delayed 6 to 12 hours after exposure. Because there is a potential for this product to cause methemoglobinemia, exposure to this material should be properly controlled.

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## HEALTH EFFECTS SUMMARY - CONTINUED

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### Toxicological Data

Data from Monsanto studies and from the scientific literature indicates the following:

Oral LD50 -	Moderately Toxic	(Rat 230 mg/kg)
Dermal LD50 -	Practically Nontoxic	(Rabbit > 5,000 mg/kg)
Eye Irritation -	Corrosive	(Rabbit)
Skin Irritation -	Corrosive	(Rabbit, 24-hr.)
Skin Irritation -	<u>Slightly Irritating</u> - Slight erythema. All animals were free of dermal irritation within 1 to 7 days.(Rabbit, 4-hr.)	
DOT Skin Irritation -	Not Corrosive	(Rabbit, 4-hr.)

In a dust inhalation toxicity study, male and female rats were exposed to para-nitrophenol at atmospheric concentrations of 1.09, 5.27 or 29.18 mg/m<sup>3</sup>, 6 hours/day, 5 days/week for 4 weeks. Ocular lesion including cataracts and drying of the cornea and the conjunctiva were observed in the 29.18 mg/m<sup>3</sup> exposure group. No methemoglobinemia and no adverse effects on histopathological and biochemical evaluations were noted. The no-effect level was considered to be 5.27 mg/m<sup>3</sup>.

Administration of para-nitrophenol by gavage to mice at a dosage level of 400 mg/kg/day on days 7 through 15 of pregnancy was reported to produce significant maternal mortality, but no effects on pup survival or pup weights on post delivery days 1 and 3. No gross malformations were observed in the neonates.

Studies in the scientific literature report that para-nitrophenol was negative for mutagenic or genotoxic activity in three separate microbial assays with Salmonella strains, in a rat hepatocyte primary culture unscheduled DNA synthesis assay, and in an in vivo host mediated assay with mice. para-Nitrophenol was reported to induce DNA damage (S. cerevisiae mitotic gene conversion and P. mirabilis growth inhibition) and to decrease mitotic index in Vicia faba root system. Mitotic inhibition and chromosomal fragmentation were also reported in root tips of Allium cepa.

Approximately 86 percent of a single dose of 200 mg/kg of para-nitrophenol was excreted in the urine of rabbits as the glucuronide or sulfate conjugate of nitrophenol. A small portion (approximately 14%) of the nitro groups were reduced to the amino group. Most of the conjugated nitro group metabolites are excreted within 24 hours while most of the amino group metabolites are excreted within 48 hours. In a species comparison study, the order of rate of elimination of para-nitrophenol from the fastest to the slowest was mouse, rabbit, guinea pig, and rat.

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## PHYSICAL DATA

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Appearance:	Colorless to slightly yellow crystalline solid
Odor:	Odorless
Melting Point:	114°C (235°F)
Vapor Pressure @ 120°C (mm Hg):	0.60
Vapor Density @ 65°C (Air = 1):	1.244
Solubility in Water @ 25°C:	1.6 g/100 ml
Solubility in Ethanol @ 25°C:	189.5 g/100 ml

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## PHYSICAL DATA - CONTINUED

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NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

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## SPILL, LEAK, & DISPOSAL INFORMATION

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Emergency Spill and Leak Information: Contain spills and leaks to prevent discharge to the environment.

Sweep, scoop or vacuum up all spilled material. Place all spilled material, contaminated dirt, contaminated clothing, sweeping compound, and other contaminated material in a metal or plastic coated fibre drum.

If possible, complete clean-up on a dry basis. After all practical dry cleanup has been done, scrub exposed surface with strong detergent or soda ash solution. Use small quantities of liquid and repeat washings until material is removed. Soak up washings in an absorbent material (such as clay) and place in drums.

para-Nitrophenol is a hazardous substance under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (Superfund). If 100 pounds or more of para-nitrophenol are released into the environment, it must be reported to the National Response Center (800-424-8802 or 202-426-2675).

Keep product out of sewers, watersheds, and water systems. If product escapes to a sewer, etc. and cannot be contained and cleaned up, flush with large amounts of water. Follow all protective measures indicated in the "Occupational Control Procedures" section of this document during clean-up operations. Avoid breathing dust and avoid skin or eye contact.

Disposal Information: This product can become a hazardous waste as designated by the Environmental Protection Agency under the authority of the Resource Conservation and Recovery Act (RCRA). Product (or waste) has RCRA Hazardous Waste Number U170 as designated in 40 CFR 261.33. This material is subject to the RCRA Land Disposal Restriction of 40 CFR 268. Disposal by incineration is Best Available Demonstrated Treatment (BDAT). All federal, state, and local regulations should be followed in disposing of this substance.

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## ENVIRONMENTAL EFFECTS

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Environmental Toxicity Information:

48-hr LC50 <u>Daphnia magna</u> :	22 mg/l, Slightly Toxic
96-hr LC50 Bluegill sunfish:	5.8 mg/l, Moderately Toxic
96-hr LC50 Fathead minnow (dynamic system):	60.5 mg/l, Slightly Toxic
96-hr LC50 Fathead minnow (static system):	10 mg/l, Moderately Toxic
96-hr LC50 Sheepshead minnow:	32 mg/l, Slightly Toxic

MONSANTO MATERIAL SAFETY DATA  
PARA-NITROPHENOL

Page 7 of 7

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DATE: 9/29/93

SUPERSEDES: 2/21/91

MSDS NUMBER 000100027

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4/93

MONSANTO PRODUCT NAME

**ORTHO-NITROANILINE**
**MONSANTO COMPANY  
800 NO. LINDBERGH BLVD.  
ST. LOUIS, MO 63167**

FOR CHEMICAL EMERGENCY, SPILL LEAK, FIRE, EXPOSURE, OR ACCIDENT

Call CHEMTREC - Day or Night - 1-800-424-9300 Toll free in the continental U.S., Hawaii, Puerto Rico, Canada, Alaska, or Virgin Islands. For calls originating elsewhere: 202-483-7616 (collect calls accepted)

For additional non-emergency information, call: 314-694-2333

## PRODUCT IDENTIFICATION

Synonym(s):	ONA, 2-Nitroaniline, 1-Amino-2-Nitrobenzene
Chemical Name:	Benzenamine, 2-Nitro-
Chemical Formula:	C <sub>6</sub> H <sub>4</sub> NH <sub>2</sub> NO <sub>2</sub>
CAS No.:	88-74-4
TSCA Inventory:	ortho-Nitroaniline appears on the Inventory of Chemical Substances published by the U.S. Environmental Protection Agency (EPA) under authority of the Toxic Substances Control Act (TSCA).
DOT Proper Shipping Name:	Nitroaniline
DOT Hazard Class/I.D. No./ Packing Group:	6.1 Poisonous Materials, UN1661, PG II
DOT Label(s):	Poison
U.S. Surface Freight Classification:	Dye Intermediate, N.O.I.B.N.
Reportable Quantity (RQ) Under U.S. EPA CERCLA Regulations:	Not Listed
<b>SARA Hazard Notification</b>	
Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370):	Immediate
Section 313 Toxic Chemical(s):	Not Applicable

**Hazardous Chemical(s) Under OSHA Hazard Communication Standard:**

This substance is identified as a hazardous chemical under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

133735



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## WARNING STATEMENTS

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### DANGER!

MAY BE FATAL IF INHALED, SWALLOWED, OR ABSORBED THROUGH SKIN  
CAUSES METHEMOGLOBINEMIA, DECREASING OXYGEN IN BLOOD  
FOR FLAKES ONLY: COMBUSTIBLE DUST - EXPLOSION POTENTIAL  
FOR MOLTEN ONLY: HOT MATERIAL CAN CAUSE THERMAL BURNS

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## PRECAUTIONARY MEASURES

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Do not get in eyes, on skin, or on clothing.  
Do not breathe dust or vapor.  
Do not take internally.  
Keep flakes away from sparks and flame; avoid creating dust cloud in handling, transfer and clean-up.  
Keep container closed.  
Use only with adequate ventilation or wear a suitable respirator.  
Wash thoroughly after handling.

Emptied container retains vapor and product residue. Observe labeled safeguards until container is destroyed. DO NOT REUSE THIS CONTAINER.

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## EMERGENCY AND FIRST AID PROCEDURES

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POISON: GET MEDICAL ATTENTION. CONTACT A POISON CONTROL CENTER.

FIRST AID: IF IN EYES OR ON SKIN, immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. As soon as available, wash skin thoroughly with soap and plenty of water. Wash clothing thoroughly before reuse. Destroy contaminated shoes.

IF INHALED, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

IF SWALLOWED, induce vomiting immediately as directed by medical personnel. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

NOTE TO PHYSICIANS: If absorbed this product may cause methemoglobinemia which reduces oxygen carrying capacity of blood. Methemoglobin spontaneously but slowly reverts to hemoglobin after termination of exposure. Asymptomatic patients with methemoglobin levels under 30% require bed rest, oxygen, and supportive care. Patients with symptoms or with methemoglobin greater than 30% may also respond to intravenous injection of methylene blue. See package insert for indications, dosage, and precautions or call Poison Control Center for guidance. Repeat methemoglobin level one to two hours after antidote to assess response. Thorough cleansing of contaminated skin, nails and hair is essential to prevent continued absorption and methemoglobin formation.

IN CASE OF SPILL OR LEAK, Keep people away. Keep upwind. Shut off leak if without risk. If necessary to enter spill area, wear self-contained breathing apparatus and full protective clothing including boots. Allow molten material to solidify, scoop up and place in container. Wear protective gloves, eye protection, rubber boots and protective, long-sleeved clothing. Do not blow material. Use vacuum equipment designed specifically for handling combustible dusts. Keep out of sewer, watersheds, and waterways. Notify pollution control authorities.

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## OCCUPATIONAL CONTROL PROCEDURES

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Aromatic amino compounds such as ortho-nitroaniline are known to cause methemoglobinemia in man following oral, dermal, or inhalation exposure.

**Eye Protection:** Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment available.

**Skin Protection:** ortho-Nitroaniline may be absorbed through the skin causing methemoglobinemia. Care must be taken to prevent skin contact. Wear chemical resistant gloves and boots, and protective long sleeved clothing when there is potential for skin contact. If handled as a liquid, wear a face shield and chemical resistant apron when splashing is likely. Wash contaminated skin immediately and thoroughly with soap and water. Launder contaminated clothing and clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

**Respiratory Protection:** Avoid breathing dust or vapor. Use NIOSH/MSHA approved respiratory protection equipment (full facepiece recommended) when airborne exposure is excessive. If used, full facepiece replaces need for face shield and/or chemical goggles. Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer. Respiratory protection programs must comply with 29 CFR § 1910.134.

**Ventilation:** Provide ventilation to minimize exposure. Consult NFPA Standard 91 for design of exhaust systems. Use local exhaust ventilation at sources of air contamination such as open process equipment.

### Airborne Exposure Limits:

ortho-Nitroaniline (99% by weight of product)

OSHA PEL:  
ACGIH TLV:

None Established  
None Established

Monsanto has adopted an internal exposure guideline of 3 mg/m<sup>3</sup> 8-hour time-weighted average- Skin\* for this material.

\*Skin notation means that skin absorption of this material may add to the overall exposure. Avoid skin contact.

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## FIRE PROTECTION INFORMATION

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**Flash Point:** 266°F **Method:** Cleveland Open Cup

**Extinguishing Media:** Water spray, foam, dry chemical, carbon dioxide or any Class B extinguishing agent.

**Special Fire Fighting Procedures:** Fire fighters or others who may be exposed to products of combustion should wear full protective clothing including self-contained breathing apparatus. Fire fighting equipment should be thoroughly decontaminated after use.

**Unusual Fire and Explosion Hazards:** This material, when packaged and handled, as flakes, can contain sufficient fines to present a potential dust explosion hazard if a sufficient quantity of this material is dispersed in air.

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## REACTIVITY DATA

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Stability: Product is stable under ordinary conditions of handling and storage.

Materials to Avoid: Strong oxidizing agents, alkalis.

Hazardous Decomposition Products: Decomposition products are oxides of nitrogen, carbon monoxide (CO), soot, and smoke.

Hazardous Polymerization: Does not occur

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## HEALTH EFFECTS SUMMARY

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The following information summarizes human experience and results of scientific investigations reviewed by health professionals for hazard evaluation of ortho-nitroaniline and development of Precautionary Statements and Occupational Control Procedures recommended in this document.

### Effects of Exposure

Inhalation and skin contact are expected to be the primary routes of occupational exposure to ortho-nitroaniline. Although ortho-nitroaniline is considered only slightly toxic on the basis of single exposure animal tests, human experience has shown that man is much more sensitive to methemoglobinemia caused by aromatic amino compounds than the rat or the rabbit.

Methemoglobinemia is a condition caused by changes in the blood cells which decrease the oxygen-carrying capacity of the blood. Cyanosis may occur and, as oxygen deficiency increases, there may be associated headache, weakness, irritability, drowsiness, shortness of breath, and unconsciousness. The appearance of methemoglobinemia may be delayed 6 to 12 hours after exposure. Because of the high potential for this material to cause methemoglobin formation, ortho-nitroaniline should be considered HAZARDOUS by all routes of exposure and exposures should be tightly controlled.

### Toxicological Data

Data from laboratory studies conducted by Monsanto and from the scientific literature with ortho-nitroaniline are summarized below.

Single exposure (acute) studies indicate:

Oral -	Slightly Toxic	(Rat LD50 2,050 mg/kg)
Dermal -	Practically Nontoxic	(Rabbit LD50 >7,940 mg/kg)
Inhalation -	Slightly Toxic	(Rat 4-hr LC50 >6.6 mg/l)
Eye Irritation -	Practically Nonirritating	(Rabbit, 1.5/110.0)
Skin Irritation -	Nonirritating	(Rabbit, 24-hr exposure, 0.0/8.0)

No adverse effects were reported in a repeated oral dosing study (2-week) with rats. Following repeated inhalation (4-weeks) of ortho-nitroaniline in ethylene glycol monoethyl ether, testicular effects were observed in rats. Because adverse reproductive effects have been reported in the scientific literature for ethylene glycol monoethyl ether, a second 4-week inhalation study was conducted to determine whether the observed testicular effects were reproducible and related to ortho-nitroaniline itself. In the second study, exposure to ortho-nitroaniline alone had no effect on rat testes. A very slight increase in methemoglobin formation occurred at the highest exposure level in this study.

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## HEALTH EFFECTS SUMMARY - CONTINUED

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A single birth defect (situ inversus of the stomach with heart malformation) was observed in two offspring of rats given ortho-nitroaniline orally during pregnancy at an amount which produced toxic effects on the mothers. ortho-Nitroaniline produced no genetic changes in standard tests using animals or animal cells. Both positive and negative responses have been reported in assays using bacterial cells.

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## PHYSICAL DATA

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Appearance:	Orange crystalline mass or flakes or orange molten liquid
Melting Point:	71.5°C (106° F)
Crystallizing Point:	Refined, 69.7°C. min.
Bolling Point	@ 760 mm Hg: 284°C
	@ 1 mm Hg: 104°C
Specific Gravity 85/4°C:	1.255
Solubility in Water @ 25°C:	0.1%

Note: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specification items.

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## SPILL, LEAK, & DISPOSAL INFORMATION

---

Emergency Spill and Leak Information: Keep people away and keep upwind from the spill or leak. Shut off leak if this can be done without risk. Insure adequate ventilation if necessary to enter spill are, wear self-contained breathing apparatus and full protective clothing including boots. Allow molten material to solidify, scoop up and place in a container. Wear protective gloves, eye protection, rubber boots and protective, long-sleeved clothing. Avoid creating dust cloud as this material, if dispersed in air, could present a potential dust explosion hazard. Do not blow material. Use vacuum equipment designed specifically for handling combustible dusts. Keep material out of sewers, watersheds, and waterways. Notify pollution control authorities.

Disposal Information: Waste should be incinerated in accordance with all local, state, and federal regulations.

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## ENVIRONMENTAL EFFECTS

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### Environmental Toxicity Information:

48-hr LC50 Daphnia magna: 14.5 mg/l, Slightly Toxic

ortho-Nitroaniline was evaluated in a semi-continuous sludge test without acclimation. Primary degradation was approximately 4-18%. Biodegradability is classified as resistant.

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DATE: 3/18/93

SUPERSEDES: 12/18/92

MSDS NUMBER 000088744

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NOTE: THIS PRODUCT WAS DISCONTINUED 1981

12-1-89

MONSANTO COMPANY  
INFORMATION CENTER  
CREVE COEUR

103771

Form Approved  
Budget Bureau No. 44-R1387  
Approval Expires April 30, 1977

NO. C-1000  
May 1966

## U.S. DEPARTMENT OF LABOR

WORKPLACE STANDARDS ADMINISTRATION

Bureau of Labor Standards

# MATERIAL SAFETY DATA SHEET

### SECTION I

99-49

MANUFACTURER'S NAME Monsanto Company	EMERGENCY TELEPHONE NO. (713) 581-2161, Alvin, Texas
ADDRESS (Number, Street, City, State, and ZIP Code) 800 N. Lindbergh Boulevard, St. Louis, Missouri 63166	
CHEMICAL NAME AND SYNONYMS Naphthalene-Tar Camphor, Naphthalin,	TRADE NAME AND SYNONYMS Naphthalene
CHEMICAL FAMILY White Tar Polynuclear Aromatic	FORMULA C <sub>10</sub> H <sub>8</sub>

### SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

### SECTION III PHYSICAL DATA

BOILING POINT (°F.)	424	SPECIFIC GRAVITY (H <sub>2</sub> O = 1)	1.145
VAPOR PRESSURE (mm Hg.)	0.082	PERCENT VOLATILE BY VOLUME (%)	100%
VAPOR DENSITY (AIR = 1)	4.42	EVAPORATION RATE (Butylacetate)	<1
SOLUBILITY IN WATER	Neg.		
APPEARANCE AND ODOR	White Crystalline Solid - Moth Ball Odor		

### SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) 174°F - Closed Cup	FLAMMABLE LIMITS	LEL 0.9	UEL 5.9
EXTINGUISHING MEDIA Water, Dry Chemicals, Carbon Dioxide and Foam			
SPECIAL FIRE FIGHTING PROCEDURES Isolate area, contain the fire, cool equipment, protect exposures, avoid breathing vapors caused by fire.			
UNUSUAL FIRE AND EXPLOSION HAZARDS			
None			

## SECTION V HEALTH HAZARD DATA

## THRESHOLD LIMIT VALUE

No MAC has been established for naphthalene.

## EFFECTS OF OVEREXPOSURE

Inhalation may cause headache, confusion, nausea and profuse perspiration.

## EMERGENCY AND FIRST AID PROCEDURES

Remove from area - call a physician.

## SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	Yes	

## INCOMPATIBILITY (Materials to avoid)

## HAZARDOUS DECOMPOSITION PRODUCTS

CO, CO<sub>2</sub>

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	Yes	

## SECTION VII SPILL OR LEAK PROCEDURES

## STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Normal clean up operation - remove ignition sources.

## WASTE DISPOSAL METHOD

## SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Industrial canister type gas masks for &lt;2% naphthalene in air - Air masks for &gt;2% naphthalene.

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General) Generally sufficient.	OTHER

## PROTECTIVE GLOVES

Rubber and/or asbestos

## EYE PROTECTION

Goggles or face shield.

## OTHER PROTECTIVE EQUIPMENT

## SECTION IX SPECIAL PRECAUTIONS

## PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep away from ignition sources or heat. Store in closed containers.

Avoid skin and eye contact with dusts.

## OTHER PRECAUTIONS

None



THE WORLD'S FOREMOST MANUFACTURER OF RESEARCH  
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MSDS COORDINATOR R3B  
MONSANTO COMPANY  
800 N LINDBERGH BLVD  
ST LOUIS MO 63167-0001

EMERGENCY PHONE 1-314-771-5765

DATE: 06/10/93  
CUST#: 6-049-57830  
PO#: 0020R349887

# M A T E R I A L   S A F E T Y   D A T A   S H E E T PAGE 1

## I D E N T I F I C A T I O N

PRODUCT #: P2146  
CAS #: 129-00-0  
MF: C16H10  
NAME: PYRENE

## SYNONYMS

BENZO(DEF)PHENANTHRENE \* COAL TAR PITCH VOLATILES:PYRENE (OSHA) \*  
PYREN (GERMAN) \* BETA-PYRENE \*

## T O X I C I T Y   H A Z A R D S

RTECS #: UR2450000  
PYRENE

IRRITATION DATA  
SKN-RBT 500 MG/24H MLD

28ZPAK -,26,72

TOXICITY DATA  
ORL-RAT LD50:2700 MG/KG  
IHL-RAT LC50:170 MG/M3  
ORL-MUS LD50:800 MG/KG  
IPR-MUS LD50:514 MG/KG

GTPZAB 15(2),59,71  
GTPZAB 15(2),59,71  
GTPZAB 15(2),59,71  
PMRSDJ 1,682,81

## R E V I E W S ,   S T A N D A R D S ,   A N D   R E G U L A T I O N S

IARC CANCER REVIEW:ANIMAL INADEQUATE EVIDENCE IMEMDT 32,431,83  
IARC CANCER REVIEW:HUMAN NO ADEQUATE DATA IMEMDT 32,431,83  
IARC CANCER REVIEW:GROUP 3 IMSUDL 7,56,87  
OSHA PEL:8H TWA 0.2 MG/M3 FEREAC 54,2923,89  
OSHA PEL FINAL:8H TWA 0.2 MG/M3 FEREAC 54,2923,89  
NOHS 1974: H2D T1328; NIS 1; TNF 11; NOS 1; TNE 32  
NOES 1983: H2D T1328; NIS 3; TNF 560; NOS 3; TNE 9387  
EPA GENETOX PROGRAM 1988, NEGATIVE: CELL TRANSFORM.-BALB/C-3T3; SHE-  
CLONAL ASSAY  
EPA GENETOX PROGRAM 1988, NEGATIVE: CELL TRANSFORM.-MOUSE EMBRYO  
EPA GENETOX PROGRAM 1988, NEGATIVE: CELL TRANSFORM.-RLV F344 RAT  
EMBRYO  
EPA GENETOX PROGRAM 1988, NEGATIVE: IN VITRO CYTOGENETICS-NONHUMAN;  
HOST-MEDIATED ASSAY  
EPA GENETOX PROGRAM 1988, NEGATIVE: HISTIDINE REVERSION-AMES TEST; IN  
VIVO SCE-NONHUMAN  
EPA GENETOX PROGRAM 1988, NEGATIVE: SPERM MORPHOLOGY-MOUSE; IN VITRO  
UDS-HUMAN FIBROBLAST  
EPA GENETOX PROGRAM 1988, NEGATIVE: V79 CELL CULTURE-GENE MUTATION  
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: CARCINOGENICITY-MOUSE/RAT;  
MAMMALIAN MICRONUCLEUS  
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: IN VITRO SCE-NONHUMAN  
EPA TSCA CHEMICAL INVENTORY, JUNE 1990  
ON EPA IRIS DATABASE

CONTINUED ON NEXT PAGE

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## M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 2

CUST#: 6-049-57830  
PO#: 0020R349887

PRODUCT #: P2146  
CAS #: 129-00-0  
MF: C16H10

NAME: PYRENE

### - - - - TOXICITY HAZARDS - - - -

EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JANUARY 1993  
NIOSH ANALYTICAL METHODS: SEE POLYNUCLEAR AROMATIC HYDROCARBONS (HPLC)  
, 5506; (GC), 5515  
OSHA ANALYTICAL METHOD #10-58

### TARGET ORGAN DATA

SENSE ORGANS AND SPECIAL SENSES (CONJUNCTIVA IRRITATION)  
BEHAVIORAL (EXCITEMENT)  
BEHAVIORAL (MUSCLE CONTRACTION OR SPASTICITY)  
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES  
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR  
COMPLETE INFORMATION.

### - - - - HEALTH HAZARD DATA - - - -

### ACUTE EFFECTS

HARMFUL IF SWALLOWED.  
MAY BE HARMFUL IF INHALED.  
MAY BE HARMFUL IF ABSORBED THROUGH THE SKIN.  
MAY CAUSE EYE IRRITATION.  
MAY CAUSE SKIN IRRITATION.  
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND  
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

### FIRST AID

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF  
WATER FOR AT LEAST 15 MINUTES.  
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS  
AMOUNTS OF WATER.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL  
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.  
CALL A PHYSICIAN.  
WASH CONTAMINATED CLOTHING BEFORE REUSE.

### ADDITIONAL INFORMATION

INHALATION STUDIES IN ANIMALS HAVE CAUSED HEPATIC, PULMONARY AND  
INTRAGASTRIC PATHOLOGIC CHANGES. NEUTROPHIL, LEUKOCYTE AND ERYTHROCYTE  
LEVELS ALSO DECREASED. CUTANEOUS APPLICATION CAUSED HYPEREMIA,  
WEIGHT LOSS AND HEMATOPOIETIC CHANGES AND DERMATITIS. CHRONIC EFFECTS:

CONTINUED ON NEXT PAGE

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CUST#: 6-049-57830  
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PRODUCT #: P 2146  
CAS #: 129-00-0      NAME: PYRENE  
MF: C16H10

--- HEALTH HAZARD DATA ---

LEUKOCYTOSIS.

--- PHYSICAL DATA ---

MELTING POINT: 149 C TO 151 C

APPEARANCE AND ODOR  
YELLOW CRYSTALS AND POWDER

--- FIRE AND EXPLOSION HAZARD DATA ---

EXTINGUISHING MEDIA

WATER SPRAY.  
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO  
PREVENT CONTACT WITH SKIN AND EYES.

--- REACTIVITY DATA ---

INCOMPATIBILITIES

STRONG OXIDIZING AGENTS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:  
CARBON MONOXIDE, CARBON DIOXIDE

--- SPILL OR LEAK PROCEDURES ---

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY  
RUBBER GLOVES.

SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.

AVOID RAISING DUST.

VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL METHOD

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A  
CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

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CUST#: 6-049-57830  
PO#: 0020R349887

PRODUCT #: P2146  
CAS #: 129-00-0      NAME: PYRENE  
MF: C16H10

- - - - SPILL OR LEAK PROCEDURES - - - -

OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

- - - - PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE - - - -

CHEMICAL SAFETY GOGGLES.  
RUBBER GLOVES.  
NIOSH/MSHA-APPROVED RESPIRATOR.  
SAFETY SHOWER AND EYE BATH.  
MECHANICAL EXHAUST REQUIRED.  
AVOID INHALATION.  
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.  
AVOID PROLONGED OR REPEATED EXPOSURE.  
WASH THOROUGHLY AFTER HANDLING.  
HARMFUL SOLID.  
KEEP TIGHTLY CLOSED.

LABEL PRECAUTIONARY STATEMENTS

STORE IN A COOL DRY PLACE.  
HARMFUL  
HARMFUL IF SWALLOWED.  
TARGET ORGAN(S):  
LIVER  
BLOOD  
WEAR SUITABLE PROTECTIVE CLOTHING.

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DATE: 02/20/92  
CUST#: 325902  
PO#: R294172

**M A T E R I A L   S A F E T Y   D A T A   S H E E T**      **P A G E   1**

**IDENTIFICATION**

PRODUCT #: 24518-6      NAME: CHRYSENE, 98%  
CAS #: 218-01-9  
MF: C18H12

**SYNONYMS**

1,2-BENZOPHENANTHRENE \* BENZO(A)PHENANTHRENE \* 1,2-BENZPHENANTHRENE \*  
BENZ(A)PHENANTHRENE \* CHRYSENE (OSHA) \* 1,2,5,6-DIBENZONAPHTHALENE \*  
RCRA WASTE NUMBER U050 \*

**TOXICITY HAZARDS**

RTECS NO: GC0700000

CHRYSENE

**REVIEWS, STANDARDS, AND REGULATIONS**

IARC CANCER REVIEW: ANIMAL LIMITED EVIDENCE IMEMDT 32,247,83  
IARC CANCER REVIEW: HUMAN NO ADEQUATE DATA IMEMDT 32,247,83  
IARC CANCER REVIEW: GROUP 3 IMISUDL 7,56,87  
OSHA PEL: 8H TWA 0.2 MG/M3 FEREAC 54,2923,89  
OSHA PEL FINAL: 8H TWA 0.2 MG/M3 FEREAC 54,2923,89  
NIOSH REL TO CHRYSENE-TO BE CONTROLLED AS A CARCINOGEN MMWR\*\* 37(S-7),  
8,88  
NOSH 1974: HZD T1320; NIS 1; TNF 11; NOS 1; TNE 32  
NOSH 1983: HZD T1320000; TNF 2; NIS 553; NOS 2; TNE 3359  
EPA GENETOX PROGRAM 1988, POSITIVE: SHE-CLONAL ASSAY; HISTIDINE  
REVERSION-AMES TEST  
EPA GENETOX PROGRAM 1988, POSITIVE/LIMITED: CARCINOGENICITY-MOUSE/RAT  
EPA GENETOX PROGRAM 1988, NEGATIVE: CELL TRANSFORM.-MOUSE PROSTATE  
EPA GENETOX PROGRAM 1988, NEGATIVE: CYTOGENETICS-MALE GERM CELL; HOST-  
MEDIATED ASSAY  
EPA GENETOX PROGRAM 1988, NEGATIVE: E COLI POLA WITH S9; S CEREVISIAE-  
HOMIOGOSIS  
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: E COLI POLA WITHOUT S9; IN  
VIVO SCE-NONHUMAN  
EPA TSCA CHEMICAL INVENTORY, JUNE 1990  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, MARCH 1991  
NIOSH ANALYTICAL METHODS: SEE POLYNUCLEAR AROMATIC HYDROCARBONS (HPLC)  
, 5506; (GC), 5515  
OSHA ANALYTICAL METHOD #ID-58

**TARGET ORGAN DATA**

SKIN AND APPENDAGES (TUMORS)  
TUMORIGENIC (NEOPLASTIC BY RTECS CRITERIA)  
TUMORIGENIC (EQUIVOCAL TUMORIGENIC AGENT BY RTECS CRITERIA)  
TUMORIGENIC (TUMORS AT SITE OF APPLICATION)

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS)

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M A T E R I A L   S A F E T Y   D A T A   S H E E T   P A G E   2

CUST#: 325902  
PO#: R294172

PRODUCT #: 24518-5  
CAS #: 218-01-9  
MF: C18H12

NAME: CHRYSENE, 98%

----- TOXICITY HAZARDS -----

DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

----- HEALTH HAZARD DATA -----

ACUTE EFFECTS

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.  
MAY CAUSE IRRITATION.

CHRONIC EFFECTS

CARCINOGEN.  
MAY ALTER GENETIC MATERIAL.  
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND  
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

FIRST AID

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS  
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED  
CLOTHING AND SHOES.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL  
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.  
CALL A PHYSICIAN.  
DISCARD CONTAMINATED CLOTHING AND SHOES.

----- PHYSICAL DATA -----

BOILING PT: 448 C  
MELTING PT: 252 C TO 254 C  
APPEARANCE AND ODOR  
OFF-WHITE FLAKES

----- FIRE AND EXPLOSION HAZARD DATA -----

EXTINGUISHING MEDIA

WATER SPRAY.  
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO  
PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

----- REACTIVITY DATA -----

INCOMPATIBILITIES

STRONG OXIDIZING AGENTS

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M A T E R I A L   S A F E T Y   D A T A   S H E E T   P A G E   3

CUST#: 325902  
PO#: R294172

PRODUCT #: 24518-6  
CAS #: 218-01-9  
MF: C18H12

NAME: CHRYSENE, 98%

----- REACTIVITY DATA -----

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:  
CARBON MONOXIDE, CARBON DIOXIDE

----- SPILL OR LEAK PROCEDURES -----

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

EVACUATE AREA.  
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.  
WEAR DISPOSABLE COVERALLS AND DISCARD THEM AFTER USE.  
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.  
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL METHOD

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.  
SAFETY SHOWER AND EYE BATH.  
USE ONLY IN A CHEMICAL FUME HOOD.  
DO NOT BREATHE DUST.  
AVOID ALL CONTACT.  
AVOID PROLONGED OR REPEATED EXPOSURE.  
WASH THOROUGHLY AFTER HANDLING.  
CARCINOGEN.  
MUTAGEN.  
HARMFUL SOLID.  
KEEP TIGHTLY CLOSED.  
STORE IN A COOL DRY PLACE.

LABEL PRECAUTIONARY STATEMENTS

TOXIC  
MAY CAUSE CANCER.  
MAY CAUSE HERITABLE GENETIC DAMAGE.  
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.  
IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW THE LABEL WHERE POSSIBLE).  
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE PROTECTION.

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CUST#: 325902  
PO#: R294172

PRODUCT #: 24518-5  
CAS #: 218-01-9  
MF: C18H12

NAME: CHRYSENE, 98%

--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---

KEEP CONTAINER TIGHTLY CLOSED IN A COOL WELL VENTILATED PLACE.

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135198  
10/93

ATTN: SAFETY DIRECTOR  
MONSANTO COMPANY  
ENVIRONMENTAL HLTH LAB  
645 SO NEWSTEAD  
ST LOUIS MO 63110-1116

EMERGENCY PHONE 1-314-771-5765

DATE: 10/30/93  
CUST#: 6-049-57832  
PO#: EHL1036XMP

## M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 1

### SECTION 1. - - - - - CHEMICAL IDENTIFICATION - - - - -

STOCK #39556-0  
PRODUCT #: T1665 NAME: 1,2,4-TRICHLOROBENZENE NEAT STANDARD  
FOR EPA  
METHODS 1

### SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - -

CAS #: 120-82-1  
MF: C6H3CL3  
SYNONYMS  
HOSTETEX L-PEC \* UNSYM-TRICHLOROBENZENE \* 1,2,4-TRICHLOROBENZENE \* 1,  
2,5-TRICHLOROBENZENE \* 1,3,4-TRICHLOROBENZENE \* 1,2,4-  
TRICHLOROBENZENE (ACGIH, OSHA) \* 1,2,4-TRICHLOROBENZOL \*  
TROJCHLOROBENZEN (POLISH) \*

### SECTION 3. - - - - - HAZARDS IDENTIFICATION - - - - -

LABEL PRECAUTIONARY STATEMENTS  
TOXIC (USA DEFINITION)  
HARMFUL (EUROPEAN DEFINITION)  
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.  
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.  
TARGET ORGAN(S):  
LIVER  
KIDNEYS  
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF  
WATER AND SEEK MEDICAL ADVICE.  
WEAR SUITABLE PROTECTIVE CLOTHING.

### SECTION 4. - - - - - FIRST-AID MEASURES - - - - -

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS  
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED  
CLOTHING AND SHOES.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL  
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.  
CALL A PHYSICIAN.  
WASH CONTAMINATED CLOTHING BEFORE REUSE.

CONTINUED ON NEXT PAGE

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135198



**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

PAGE 2

STOCK #: 39556-0

CUST#: 6-049-57832

PRODUCT #: T1665  
MF: C6H3CL3

NAME: 1,2,4-TRICHLOROBENZENE NEAT STANDARD  
FOR EPA  
METHODS

PO#: EHL1036XMP

**SECTION 5. - - - - - FIRE FIGHTING MEASURES - - - - -**

**EXTINGUISHING MEDIA**

WATER SPRAY.

CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

**SPECIAL FIRE FIGHTING PROCEDURES**

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO  
PREVENT CONTACT WITH SKIN AND EYES.

**UNUSUAL FIRE AND EXPLOSIONS HAZARDS**

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

**SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES - - - - -**

EVACUATE AREA.

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY  
RUBBER GLOVES.

ABSORB ON SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR  
DISPOSAL.

VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

**SECTION 7. - - - - - HANDLING AND STORAGE - - - - -**  
REFER TO SECTION 8.

**SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION - - - - -**

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT  
GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.

SAFETY SHOWER AND EYE BATH.

USE ONLY IN A CHEMICAL FUME HOOD.

DO NOT BREATHE VAPOR.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

AVOID PROLONGED OR REPEATED EXPOSURE.

WASH THOROUGHLY AFTER HANDLING.

TOXIC.

IRRITANT.

HARMFUL LIQUID AND FUMES.

KEEP TIGHTLY CLOSED.

STORE IN A COOL DRY PLACE.

**SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -**

CONTINUED ON NEXT PAGE

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PAGE 3

STOCK #: 39556-0

CUST#: 6-049-57832

PQ#: EHL1036XMP

PRODUCT #: T1665  
MF: C6H3CL3

NAME: 1,2,4-TRICHLOROBENZENE NEAT STANDARD  
FOR EPA  
METHODS

DATA NOT AVAILABLE

BOILING POINT: 214 C  
MELTING POINT: 16 C  
FLASHPOINT >230

BY:

SECTION 10. - - - - - STABILITY AND REACTIVITY- - - - -

INCOMPATIBILITIES

STRONG OXIDIZING AGENTS  
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS  
TOXIC FUMES OF:  
CARBON MONOXIDE, CARBON DIOXIDE  
HYDROGEN CHLORIDE GAS

SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -

ACUTE EFFECTS

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.  
VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER  
RESPIRATORY TRACT.  
CAUSES SKIN IRRITATION.

CHRONIC EFFECTS

NAUSEA, DIZZINESS AND HEADACHE  
GASTROINTESTINAL DISTURBANCES  
DAMAGE TO THE LIVER  
DAMAGE TO THE KIDNEYS

RTECS NO: DC210000

BENZENE, 1,2,4-TRICHLORO-  
IRRITATION DATA

SKN-RRT 1950 MG/13W-I MOD

AEHLAU 30,165,75

TOXICITY DATA

ORL-RAT LD50:756 MG/KG

ADHYA3 12,209,69

ORL-MUS LD50:300 MG/KG

NAIZAM 29,569,78

IPR-MUS LD50:1223 MG/KG

MUTAFX 2,111,87

TARGET ORGAN DATA

BEHAVIORAL (ALTERED SLEEP TIME)  
BEHAVIORAL (SOMNOLENCE)  
BEHAVIORAL (CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD)

CONTINUED ON NEXT PAGE

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PAGE 4

STOCK #: 39556-0

CUST#: 6-049-57832

PO#: EHL1036XMP

PRODUCT #: T1665  
MF: C6H3CL3

NAME: 1,2,4-TRICHLOROBENZENE NEAT STANDARD  
FOR EPA  
METHODS

BEHAVIORAL (ATAXIA)  
MATERNAL EFFECTS (UTERUS, CERVIX, VAGINA)  
EFFECTS ON EMBRYO OR FETUS (CYTOLOGICAL CHANGES)  
EFFECTS ON EMBRYO OR FETUS (FETOTOXICITY)  
EFFECTS ON EMBRYO OR FETUS (FETAL DEATH)  
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES  
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR  
COMPLETE INFORMATION.

SECTION 12. ----- ECOLOGICAL INFORMATION -----  
DATA NOT YET AVAILABLE.

SECTION 13. ----- DISPOSAL CONSIDERATIONS -----  
DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A  
CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.  
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. ----- TRANSPORT INFORMATION -----  
CONTACT SIGMA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. ----- REGULATORY INFORMATION -----

REVIEWS, STANDARDS, AND REGULATIONS

ACGIH TLV-CL 5 PPM  
OSHA PEL FINAL:CL 5 PPM (40 MG/M3) 85INAR 5,593,86  
FEREAC 54,2923,89  
OEL-AUSTRALIA:TWA 5 PPM (40 MG/M3) JANUARY 1993  
OEL-BELGIUM:STEL 5 PPM (37 MG/M3) JANUARY 1993  
OEL-DENMARK:TWA 5 PPM (40 MG/M3) JANUARY 1993  
OEL-FINLAND:TWA 5 PPM (40 MG/M3);STEL 10 PPM (74 MG/M3);SKIN JANUARY 1993  
OEL-FRANCE:TWA 5 PPM (40 MG/M3) JANUARY 1993  
OEL-GERMANY:TWA 5 PPM (40 MG/M3) JANUARY 1993  
OEL-THE NETHERLANDS:TWA 5 PPM (40 MG/M3) JANUARY 1993  
OEL-SWITZERLAND:TWA 5 PPM (40 MG/M3) JANUARY 1993  
OEL-UNITED KINGDOM:TWA 5 PPM (40 MG/M3);STEL 5 PPM (40 MG/M3) JANUARY 1993

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### M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 5

STOCK #: 39556-0

CUST#: 6-049-57832

PO#: EHL1036XMP

PRODUCT #: T1665  
MF: C6H3CL3

NAME: 1,2,4-TRICHLOROBENZENE NEAT STANDARD  
FOR EPA  
METHODS

DEL IN BULGARIA, COLOMBIA, JORDAN, KOREA, NEW ZEALAND, SINGAPORE,  
VIETNAM CHECK ACGIH TLV  
NIOSH REL TO 1,2,4-TRICHLOROBENZENE-AIR:CL 5 PPM  
NIOSH\* DHPS #92-100,92  
NIHS 1974: H2D 83334; NIS 4; TNF 74; NOS 8; TNE 1687  
NOS 1983: H2D 83334; NIS 6; TNF 78; NOS 14; TNE 4033; TFE 1463  
EPA TSCA CHEMICAL INVENTORY, JUNE 1990  
EPA TSCA 8(A) PRELIMINARY ASSESSMENT INFORMATION, FINAL RULE  
FEREAC 47,26992,82  
ON EPA IRIS DATABASE  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JANUARY 1993  
NIOSH ANALYTICAL METHODS: SEE POLYCHLOROBENZENES, 5517  
THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

### SECTION 16. - - - - - OTHER INFORMATION - - - - -

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO  
BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. SIGMA SHALL NOT BE  
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DATE 8/11/94 MATERIAL SAFETY DATA SHEET PAGE 1

SECTION I - GENERAL INFORMATION

ATALOG NO 48665 (REORDER PRODUCT BY THIS NO.)  
PRODUCT NAME BENZO(A)PYRENE  
DATA SHEET NO I486650  
FORMULA MIXTURE BENZO(A)PYRENE FORMULA WEIGHT  
CAS NRTECS  
SYNONYM ANALYTICAL STANDARD IN METHYLENE CHLORIDE  
MANUFACTURER SUPELCO INC. PHONE 814-359-3441  
ADDRESS SUPELCO PARK, BELLEFONTE, PA 16823-0048

SECTION II - HAZARDOUS INGREDIENTS OF MIXTURES

CHEMICAL NAME  
COMMON NAME - PERCENTAGE - CAS #  
(FORMULA) - PEL(UNITS) - TLV(UNITS)  
LD50 VALUE - CONDITIONS

BENZO(A)PYRENE					
BENZO(A)PYRENE			0.02		50-32-8
C20H12			N/A	N/A	
50	MG/KG	SUBCUTANEOUS RAT	SEE FOOTNOTE(2,8)		
METHANE, DICHLORO-					
METHYLENE CHLORIDE			99.98		75-09-2
CH2Cl2			500 PPM	50	PPM
2524	MG/KG	ORAL RAT	SEE FOOTNOTE(3,6,8)		

FOOTNOTES

- 2 CLASSIFIED BY IARC AS A CLASS 2A CARCINOGEN.
- 3 CLASSIFIED BY IARC AS A CLASS 2B CARCINOGEN.
- 6 SUBJECT TO THE REPORTING REQUIREMENTS OF SARA TITLE III, SECTION 313.
- 8 CLASSIFIED BY NTP AS A GROUP B CARCINOGEN.

SECTION III - PHYSICAL DATA

BOILING POINT 40 C MM MELTING POINT -97 C  
VAPOR PRESSURE 349 MM 20.0 C VAPOR DENSITY 2.93 20.0 C (AIR=1)  
SPECIFIC GRAVITY 1.320 G/ML C (WATER=1) PERCENT VOLATILE BY VOLUME 100  
WATER SOLUBILITY 1.6 EVAPORATION RATE 0.71 (ETHER=1)  
APPEARANCE CLEAR COLORLESS LIQUID  
ODOR ETHER-LIKE ODOR

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A FLAMMABLE LIMITS LEL 12.0 UEL 19.0

EXTINGUISHING MEDIA

WATER  
CO2  
DRY CHEMICAL

SPECIAL FIRE FIGHTING PROCEDURES

WEAR SELF CONTAINED BREATHING APPARATUS WHEN FIGHTING A CHEMICAL FIRE.

UNUSUAL FIRE AND EXPLOSION HAZARDS

THE FOLLOWING TOXIC VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

ATE 8/11/94

MATERIAL SAFETY DATA SHEET

PAGE 2

CATALOG NO 48665 (REORDER PRODUCT BY THIS NO.)

PRODUCT NAME BENZO(A)PYRENE

DATA SHEET NO 1486650

BENZO(A)PYRENE

\* CONTINUED \*

HYDROGEN CHLORIDE, PHOSGENE.

SECTION V - HEALTH HAZARD DATA

LD50	2524	MG/KG	ORAL RAT	TLV	50	PPM
EL	500	PPM				

EMERGENCY AND FIRST AID PROCEDURES

EYES

FLUSH EYES WITH WATER FOR 15 MINUTES.

SKIN

PROMPTLY WASH SKIN WITH MILD SOAP AND LARGE VOLUMES OF WATER.  
REMOVE CONTAMINATED CLOTHING.

INHALATION

IMMEDIATELY MOVE TO FRESH AIR.  
GIVE OXYGEN IF BREATHING IS LABORED  
IF BREATHING STOPS, GIVE ARTIFICIAL RESPIRATION  
CONTACT A PHYSICIAN  
NEVER ADMINISTER ADRENALIN FOLLOWING CH<sub>2</sub>Cl<sub>2</sub> EXPOSURE.  
INCREASED SENSITIVITY OF THE HEART TO ADRENALIN MAY BE CAUSED BY  
OVEREXPOSURE TO CH<sub>2</sub>Cl<sub>2</sub>.

INGESTION

NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON  
NEVER TRY TO MAKE AN UNCONSCIOUS PERSON VOMIT  
DO NOT INDUCE VOMITING.  
IMMEDIATELY CONTACT A PHYSICIAN.

EFFECTS OF OVEREXPOSURE

MAY BE FATAL IF INHALED  
HARMFUL IF SWALLOWED  
CONTAINS MATERIAL(S) KNOWN TO THE STATE OF CALIFORNIA TO  
CAUSE CANCER.

LACHRIMATION  
IRRITATES SKIN  
DERMATITIS  
HEADACHE  
DIZZINESS  
NARCOSIS  
LIVER DAMAGE  
KIDNEY DAMAGE

SEVERAL CHRONIC INHALATION STUDIES REPORTED BY NIOSH REVEALED THAT  
TEST ANIMALS EXPOSED TO METHYLENE CHLORIDE CONCENTRATIONS AS HIGH AS  
10,000PPM SHOWED SLIGHT LIVER & KIDNEY CHANGES. METHYLENE CHLORIDE HAS  
BEEN SHOWN TO INCREASE THE RATE OF SPONTANEOUSLY OCCURRING MALIGNANT

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MATERIAL SAFETY DATA SHEET

PAGE 3

CATALOG NO 48665 (REORDER PRODUCT BY THIS NO.)  
PRODUCT NAME BENZO(A)PYRENE  
DATA SHEET NO 1486650  
BENZO(A)PYRENE

SECTION V - HEALTH HAZARD DATA

\* CONTINUED \*

TUMORS IN ONE STRAIN OF LABORATORY MICE & BENIGN TUMORS IN LABORATORY RATS. OTHER ANIMAL STUDIES, AS WELL AS SEVERAL HUMAN EPIDEMIOLOGY STUDIES, HAVE INDICATED A NEGATIVE RESPONSE. METHYLENE CHLORIDE IS NOT BELIEVED TO POSE A CARCINOGENIC RISK TO MAN WHEN HANDLED AS RECOMMENDED. METHYLENE CHLORIDE IS LISTED IN GROUP 2B BY IARC & NOT LISTED BY NTP OR OSHA.

CH<sub>2</sub>CL<sub>2</sub> IS METABOLIZED TO CO AND CAN STRESS THE CARDIOVASCULAR SYSTEM DUE TO INCREASED CARBOXYHEMOGLOBIN.

IN RATS METHYLENE CHLORIDE HAS BEEN SHOWN TO PRODUCE A SIGNIFICANT INCREASE IN SALIVARY GLAND TUMORS.

SECTION VI - REACTIVITY DATA

STABILITY STABLE.

CONDITIONS TO AVOID

N/A

INCOMPATIBILITY

STRONG BASES  
OXIDIZING AGENTS

HAZARDOUS DECOMPOSITION PRODUCTS

HYDROGEN CHLORIDE, PHOSGENE.

HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

CONDITIONS TO AVOID

LIQUID OXYGEN OR OTHER STRONG OXIDANTS MAY FORM EXPLOSIVE MIXTURES WITH METHYLENE CHLORIDE.

THIS MATERIAL OR ITS VAPORS WHEN IN CONTACT WITH FLAMES, HOT GLOWING SURFACES OR ELECTRIC ARCS CAN DECOMPOSE TO FORM HYDROGEN CHLORIDE GAS AND TRACES OF PHOSGENE.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

TAKE UP WITH ABSORBENT MATERIAL.

DATE 8/11/94

MATERIAL SAFETY DATA SHEET

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CATALOG NO 48665 (REORDER PRODUCT BY THIS NO.)  
PRODUCT NAME BENZO(A)PYRENE  
DATA SHEET NO I486650  
BENZO(A)PYRENE

SECTION VII - SPILL OR LEAK PROCEDURES

\* CONTINUED \*  
VENTILATE AREA.  
METHYLENE CHLORIDE VAPORS ARE HEAVIER THAN AIR AND WILL COLLECT IN LOW AREAS.

WASTE DISPOSAL METHOD

COMPLY WITH ALL APPLICABLE FEDERAL, STATE, OR LOCAL REGULATIONS

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFIC TYPE)

WEAR FACE MASK WITH ORGANIC VAPOR CANISTER.  
WEAR NIOSH/OSHA APPROVED RESPIRATORY PROTECTION.

PROTECTIVE GLOVES

WEAR NEOPRENE GLOVES.

EYE PROTECTION

WEAR PROTECTIVE GLASSES.

VENTILATION

USE ONLY IN WELL VENTILATED AREA.

SPECIAL

N/A

OTHER PROTECTIVE EQUIPMENT

N/A

SECTION IX - SPECIAL PRECAUTIONS

STORAGE AND HANDLING

STORE IN SEALED CONTAINER IN COOL, DRY LOCATION.

OTHER PRECAUTIONS

POSSIBLE CANCER HAZARD.



DATE 8/11/94

MATERIAL SAFETY DATA SHEET

PAGE 5

CATALOG NO 48665 (REORDER PRODUCT BY THIS NO.)  
PRODUCT NAME BENZO(A)PYRENE  
DATA SHEET NO 1486650  
BENZO(A)PYRENE

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LAST REVISED 12/22/92



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ST LOUIS MO 63167

DATE: 05/19/89  
CUST # 325902 P.O. # R158954

M A T E R I A L   S A F E T Y   D A T A   S H E E T   PAGE: 1

IDENTIFICATION

PRODUCT # F80-7      NAME: FLUORANTHENE, 98%  
CAS # 206-44-0  
MF: C16H10

SYNONYMS

1,2-BENZACENAPHTHENE \* BENZENE, 1,2-(1,8-NAPHTHYLENE)- \* BENZO(JK)  
FLUORENE \* IDRYL \* 1,2-(1,8-NAPHTHALENEDIYL)BENZENE \* 1,2-(1,8-  
NAPHTHYLENE)BENZENE \* RCRA WASTE NUMBER U120 \*

TOXICITY HAZARDS

RTECS # LL4025000  
FLUORANTHENE

TOXICITY DATA

ORL-RAT LD50:2000 MG/KG  
IVN-MUS LD50:100 MG/KG  
SKN-RBT LD50:3180 MG/KG

AIHAAP 23,95,62  
CSLNX\* NX#00205  
AIHAAP 23,95,62

REVIEWS, STANDARDS, AND REGULATIONS

IARC CANCER REVIEW:ANIMAL NO EVIDENCE IMEMDT 32,355,83  
IARC CANCER REVIEW:GROUP 3 IMSUDL 7,56,87  
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: CELL TRANSFORM.-RLV F344 RAT  
EMBRYO  
EPA GENETOX PROGRAM 1988, POSITIVE: CHO GENE MUTATION  
EPA TSCA CHEMICAL INVENTORY, 1986  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JANUARY 1989  
NIOSH ANALYTICAL METHODS: SEE POLYNUCLEAR AROMATIC HYDROCARBONS (HPLC)  
, 5506; (GC), 5515  
MEETS CRITERIA FOR PROPOSED OSHA MEDICAL RECCRDS RULE FEREAC 47,30420,  
82

TARGET ORGAN DATA

SKIN AND APPENDAGES (TUMORS)  
TUMORIGENIC (EQUIVOCAL TUMORIGENIC AGENT BY RTECS CRITERIA)  
TUMORIGENIC (TUMORS AT SITE OF APPLICATION)

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS)  
DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION

HEALTH HAZARD DATA

ACUTE EFFECTS

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.  
MAY CAUSE IRRITATION.

CHRONIC EFFECTS

LABORATORY EXPERIMENTS HAVE SHOWN MUTAGENIC EFFECTS.  
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND  
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

FIRST AID

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS  
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED  
CLOTHING AND SHOES.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL  
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
CALL A PHYSICIAN.  
WASH CONTAMINATED CLOTHING BEFORE REUSE.

120150

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE: 2

CATALOG # F80-7

NAME: FLUORANTHENE, 98%

-----PHYSICAL DATA-----

MELTING POINT: 107 C TO 110 C  
BOILING POINT: 384 C  
APPEARANCE: YELLOW CRYSTALS

----- FIRE AND EXPLOSION HAZARD DATA -----

EXTINGUISHING MEDIA

WATER SPRAY.  
CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.

SPECIAL FIRE FIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO  
PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSION HAZARDS

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

----- REACTIVITY DATA -----

INCOMPATIBILITIES

STRONG OXIDIZING AGENTS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:

CARBON MONOXIDE, CARBON DIOXIDE

----- SPILL OR LEAK PROCEDURES -----

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

EVACUATE AREA.

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY  
RUBBER GLOVES.

SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.

AVOID RAISING DUST.

VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL METHOD

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A  
CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT  
GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.

USE ONLY IN A CHEMICAL FUME HOOD.

SAFETY SHOWER AND EYE BATH.

DO NOT BREATHE DUST.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

AVOID PROLONGED OR REPEATED EXPOSURE.

WASH THOROUGHLY AFTER HANDLING.

POSSIBLE MUTAGEN.

KEEP TIGHTLY CLOSED.

STORE IN A COOL DRY PLACE.

----- ADDITIONAL PRECAUTIONS AND COMMENTS -----

NOT APPLICABLE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T   P A G E :   3

CATALOG # F80-7

NAME: FLUCRANTHENE, 98%

----- REGULATORY INFORMATION -----

NOT APPLICABLE

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ST LOUIS MO 63141-7843

DATE: 02/01/94  
CUST#: 326135  
PO#: V378358

M A T E R I A L   S A F E T Y   D A T A   S H E E T   P A G E   1

SECTION 1. - - - - - CHEMICAL IDENTIFICATION- - - - -

PRODUCT #: 23637-3      NAME: DIBENZOFURAN, 99+%

SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - -

CAS #:132-64-9  
MF: C12H8O

SYNONYMS

2,2'-BIPHENYLENE OXIDE \* 2,2'-BIPHENYLYLENE OXIDE \* DIBENZO(B,D)FURAN  
\* DIPHENYLENE OXIDE \*

SECTION 3. - - - - - HAZARDS IDENTIFICATION - - - - -

DATA NOT AVAILABLE

SECTION 4. - - - - - FIRST-AID MEASURES- - - - -

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF  
WATER FOR AT LEAST 15 MINUTES.  
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS  
AMOUNTS OF WATER.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL  
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.  
CALL A PHYSICIAN.  
WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION 5. - - - - - FIRE FIGHTING MEASURES - - - - -

EXTINGUISHING MEDIA

WATER SPRAY.  
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO  
PREVENT CONTACT WITH SKIN AND EYES.

SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES- - - - -

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 2

CUST#: 326135  
PO#: V378358

PRODUCT #: 236373      NAME: DIBENZOFURAN, 99+%

MF: C12H8O

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.  
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.  
AVOID RAISING DUST.  
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - HANDLING AND STORAGE - - - - -  
REFER TO SECTION 8.

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION - - - - -

CHEMICAL SAFETY GOGGLES.  
RUBBER GLOVES.  
NIOSH/MSHA-APPROVED RESPIRATOR.  
SAFETY SHOWER AND EYE BATH.  
MECHANICAL EXHAUST REQUIRED.  
AVOID CONTACT AND INHALATION.  
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.  
KEEP TIGHTLY CLOSED.  
USE WITH ADEQUATE VENTILATION.  
STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -

APPEARANCE AND ODOR

WHITE CRYSTALLINE POWDER  
BOILING POINT: 154 C TO 155 C/20MM.  
MELTING POINT: 83 C TO 85 C

SECTION 10. - - - - - STABILITY AND REACTIVITY - - - - -

INCOMPATIBILITIES

STRONG OXIDIZING AGENTS  
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 3

PRODUCT #: 236373  
MF: C12H8O

NAME: DIBENZOFURAN, 99+%

CUST#: 326135  
PO#: V378358

TOXIC FUMES OF:  
CARBON MONOXIDE, CARBON DIOXIDE

SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -

ACUTE EFFECTS

MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.  
MAY CAUSE IRRITATION.  
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND  
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

RTECS NO: HP4430000

DIBENZOFURAN

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES  
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR  
COMPLETE INFORMATION.

SECTION 12. - - - - - ECOLOGICAL INFORMATION - - - - -  
DATA NOT YET AVAILABLE.

SECTION 13. - - - - - DISPOSAL CONSIDERATIONS - - - - -

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A  
CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.  
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - TRANSPORT INFORMATION - - - - -

CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - REGULATORY INFORMATION - - - - -

REVIEWS, STANDARDS, AND REGULATIONS

NOES 1983: HZD X2115; NIS 4; TNF 291; NOS 4; TNE 3292

EPA TSCA CHEMICAL INVENTORY, JANUARY 1993

ON EPA IRIS DATABASE

EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, SEPTEMBER 1993

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 4

PRODUCT #: 236373      NAME: DIBENZOFURAN, 99+%

MF: C12H8O

CUST#: 326135  
PO#: V378358

THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

SECTION 16. - - - - - OTHER INFORMATION - - - - -

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DATE: 06/23/92  
CUST#: 325902  
PO#: V308836

**M A T E R I A L   S A F E T Y   D A T A   S H E E T**      **P A G E   1**

**IDENTIFICATION**

PRODUCT #: 10595-3      NAME: 2,4-DICHLOROPHENOL, 99%  
CAS #: 120-83-2  
MF: C<sub>6</sub>H<sub>4</sub>CL<sub>2</sub>O

**SYNONYMS**

DCP \* 2,4-DCP \* 2,4-DICHLOROHYDROXYBENZENE \* 2,4-DICHLOROPHENOL \* NCI-  
C55345 \* RCRA WASTE NUMBER U081 \*

**TOXICITY HAZARDS**

RTECS NO: SK8575000

PHENOL, 2,4-DICHLORO-

**TOXICITY DATA**

ORL-RAT LD50: 580 MG/KG  
IPR-RAT LD50: 430 MG/KG  
SCU-RAT LD50: 1730 MG/KG  
ORL-MUS LD50: 1276 MG/KG  
IPR-MUS LD50: 153 MG/KG  
ORL-MAM LD50: 464 MG/KG  
SKN-MAM LD50: 790 MG/KG

FEPR7 2,76,43  
BJPCAL 13,20,58  
FEPR7 2,76,43  
FAATDF 5,478,85  
JMCAR 18,868,75  
GISAAA 45(10),16,80  
GISAAA 45(10),16,80

**REVIEWS, STANDARDS, AND REGULATIONS**

IARC CANCER REVIEW: HUMAN LIMITED EVIDENCE IMEMDT 41,319,86  
NOES 1983: HZD X4154; NIS 1; TNF 6; NOS 1; TNE 63; TFE 23  
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: HISTIDINE REVERSION-AMES TEST  
EPA TSCA CHEMICAL INVENTORY, JUNE 1990  
ON EPA IRIS DATABASE  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, MARCH 1992  
NTP CARCINOGENESIS STUDIES (FEED); NO EVIDENCE: RAT, MOUSE NTPTR\* NTP-TR-  
353,89

**TARGET ORGAN DATA**

BEHAVIORAL (ALTERED SLEEP TIME)  
BEHAVIORAL (TREMOR)  
BEHAVIORAL (CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD)  
BEHAVIORAL (ATAXIA)  
LUNGS, THORAX OR RESPIRATION (DYSPPNAE)  
EFFECTS ON EMBRYO OR FETUS (FETOTOXICITY)  
SPECIFIC DEVELOPMENTAL ABNORMALITIES (MUSCULOSKELETAL SYSTEM)  
SPECIFIC DEVELOPMENTAL ABNORMALITIES (OTHER DEVELOPMENTAL  
ABNORMALITIES)  
NUTRITIONAL AND GROSS METABOLIC (BODY TEMPERATURE INCREASE)

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS)  
DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

**HEALTH HAZARD DATA**

**ACUTE EFFECTS**

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.

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M A T E R I A L   S A F E T Y   D A T A   S H E E T      P A G E   2

CUST#: 325902  
PO#: V308836

PRODUCT #: 10595-3  
CAS #: 120-83-2  
MF: C<sub>6</sub>H<sub>4</sub>CL<sub>2</sub>O

NAME: 2,4-DICHLOROPHENOL, 99%

----- HEALTH HAZARD DATA -----

CAUSES EYE AND SKIN IRRITATION.  
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER  
RESPIRATORY TRACT.  
DEPENDING ON THE INTENSITY AND DURATION OF EXPOSURE, EFFECTS MAY  
VARY FROM MILD IRRITATION TO SEVERE DESTRUCTION OF TISSUE.  
PROLONGED CONTACT CAN CAUSE:  
DAMAGE TO THE EYES  
SEVERE IRRITATION OR BURNS.  
CHRONIC EFFECTS  
CARCINOGEN.  
FIRST AID  
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS  
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED  
CLOTHING AND SHOES.  
ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS  
WITH FINGERS.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL  
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.  
CALL A PHYSICIAN.  
WASH CONTAMINATED CLOTHING BEFORE REUSE.

----- PHYSICAL DATA -----

BOILING PT: 209 C TO 210 C  
MELTING PT: 42 C TO 43 C  
APPEARANCE AND ODOR  
WHITE TO OFF-WHITE CRYSTALS

----- FIRE AND EXPLOSION HAZARD DATA -----

FLASHPOINT: 237 F  
EXTINGUISHING MEDIA  
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.  
SPECIAL FIREFIGHTING PROCEDURES  
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO  
PREVENT CONTACT WITH SKIN AND EYES.  
UNUSUAL FIRE AND EXPLOSIONS HAZARDS  
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

----- REACTIVITY DATA -----

INCOMPATIBILITIES  
ACID CHLORIDES

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**      **P A G E   3**

**CUST#: 325902**  
**PO#: V308836**

**PRODUCT #: 10595-3**  
**CAS #: 120-83-2**  
**MF: C6H4CL20**

**NAME: 2,4-DICHLOROPHENOL, 99%**

**----- REACTIVITY DATA -----**

**ACID ANHYDRIDES**  
**OXIDIZING AGENTS**  
**HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS**  
**TOXIC FUMES OF:**  
**CARBON MONOXIDE, CARBON DIOXIDE**  
**HYDROGEN CHLORIDE GAS**

**----- SPILL OR LEAK PROCEDURES -----**

**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED**

**EVACUATE AREA.**  
**WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.**  
**COVER WITH DRY LIME OR SODA ASH, PICK UP, KEEP IN A CLOSED CONTAINER AND HOLD FOR WASTE DISPOSAL.**  
**WEAR DISPOSABLE COVERALLS AND DISCARD THEM AFTER USE.**  
**VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.**  
**WASTE DISPOSAL METHOD**  
**DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.**

**--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---**

**WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.**  
**SAFETY SHOWER AND EYE BATH.**  
**USE ONLY IN A CHEMICAL FUME HOOD.**  
**DO NOT BREATHE VAPOR.**  
**DO NOT GET IN EYES, ON SKIN, ON CLOTHING.**  
**WASH THOROUGHLY AFTER HANDLING.**  
**TOXIC.**  
**CARCINOGEN.**  
**IRRITANT.**  
**KEEP TIGHTLY CLOSED.**  
**STORE IN A COOL DRY PLACE.**  
**LABEL PRECAUTIONARY STATEMENTS**  
**TOXIC**  
**MAY CAUSE CANCER.**  
**HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.**  
**IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.**  
**IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW THE LABEL WHERE**

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**      **P A G E   4**

**CUST#: 325902**  
**PO#: V308836**

**PRODUCT #: 10595-3**  
**CAS #: 120-83-2**  
**MF: C6H4CL2O**

**NAME: 2,4-DICHLOROPHENOL, 99%**

**--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---**

**POSSIBLE).**  
**IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF**  
**WATER AND SEEK MEDICAL ADVICE.**  
**WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE**  
**PROTECTION.**  
**DO NOT BREATHE DUST.**

**REGULATORY INFORMATION**

**THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.**

**THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE**  
**ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ALDRICH SHALL NOT BE HELD**  
**LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE**  
**ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL**  
**TERMS AND CONDITIONS OF SALE.**

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4/94

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MONSANTO COMPANY

ATTN: BARBARA RASCHE/R3B  
MSDS COORDINATOR/SAFETY&HEALTH  
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ST LOUIS MO 63141-7843

DATE: 04/27/94  
CUST#: 325902  
PO#: 0020R388959

M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 1

SECTION 1. - - - - - CHEMICAL IDENTIFICATION - - - - -

PRODUCT #: M5700-6      NAME: 2-METHYLNAPHTHALENE, 98%

SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - -

CAS #: 91-57-6  
MF: C11H10

SYNONYMS

BETA-METHYLNAPHTHALENE \* 2-METHYLNAPHTHALENE \*

SECTION 3. - - - - - HAZARDS IDENTIFICATION - - - - -

LABEL PRECAUTIONARY STATEMENTS

HARMFUL  
HARMFUL IF SWALLOWED.  
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.  
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF  
WATER AND SEEK MEDICAL ADVICE.  
WEAR SUITABLE GLOVES AND EYE/FACE PROTECTION.

SECTION 4. - - - - - FIRST-AID MEASURES - - - - -

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF  
WATER FOR AT LEAST 15 MINUTES.  
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS  
AMOUNTS OF WATER.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL  
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.  
CALL A PHYSICIAN.  
WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION 5. - - - - - FIRE FIGHTING MEASURES - - - - -

EXTINGUISHING MEDIA

WATER SPRAY.  
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 2

CUST#: 325902  
PO#: 0020R388959

PRODUCT #: M057006  
MF: C11H10

NAME: 2-METHYLNAPHTHALENE, 98%

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES- - - - -

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.  
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.  
AVOID RAISING DUST.  
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - HANDLING AND STORAGE- - - - -  
REFER TO SECTION 8.

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION- - - - -

CHEMICAL SAFETY GOGGLES.  
RUBBER GLOVES.  
NIOSH/MSHA-APPROVED RESPIRATOR.  
SAFETY SHOWER AND EYE BATH.  
MECHANICAL EXHAUST REQUIRED.  
AVOID CONTACT AND INHALATION.  
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.  
WASH THOROUGHLY AFTER HANDLING.  
HARMFUL SOLID.  
IRRITANT.  
KEEP TIGHTLY CLOSED.  
STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -

APPEARANCE AND ODOR

WHITE SOLID  
BOILING POINT: 241 C TO 242 C  
MELTING POINT: 34 C TO 36 C  
FLASHPOINT 208 F  
97C

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 3

CUST#: 325902  
PO#: 0020R388959

PRODUCT #: MC57006  
MF: C11H10

NAME: 2-METHYLNAPHTHALENE, 98%

SPECIFIC GRAVITY: 1.000

SECTION 10. - - - - - STABILITY AND REACTIVITY - - - - -

INCOMPATIBILITIES

STRONG OXIDIZING AGENTS  
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS  
TOXIC FUMES OF:  
CARBON MONOXIDE, CARBON DIOXIDE

SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -

ACUTE EFFECTS

HARMFUL IF SWALLOWED.  
MAY BE HARMFUL IF INHALED.  
MAY BE HARMFUL IF ABSORBED THROUGH THE SKIN.  
CAUSES EYE AND SKIN IRRITATION.  
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER  
RESPIRATORY TRACT.  
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND  
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

RTECS NO: QJ9635000

NAPHTHALENE, 2-METHYL-

TOXICITY DATA

ORL-RAT LD50: 1630 MG/KG

85GMAT - 85.82

TARGET ORGAN DATA

LUNGS, THORAX OR RESPIRATION (CHANGE IN TRACHEA OR BRONCHI)  
LUNGS, THORAX OR RESPIRATION (OTHER CHANGES)  
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES  
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR  
COMPLETE INFORMATION.

SECTION 12. - - - - - ECOLOGICAL INFORMATION - - - - -

DATA NOT YET AVAILABLE.

SECTION 13. - - - - - DISPOSAL CONSIDERATIONS - - - - -

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 4

CUST#: 325902  
PO#: 0020R388959

PRODUCT #: M057006  
MF: C11H10

NAME: 2-METHYLNAPHTHALENE, 98%

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER. OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - TRANSPORT INFORMATION - - - - -

CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - REGULATORY INFORMATION - - - - -

REVIEWS, STANDARDS, AND REGULATIONS

DEL-RUSSIA: STEL 20 MG/M3 JANUARY 1993  
DEL IN BULGARIA, COLOMBIA, JORDAN, KOREA, NEW ZEALAND, SINGAPORE,  
VIETNAM CHECK ACGIH TLV  
NOHS 1974: HZD M1659; NIS 10; TNF 633; NOS 15; TNE 3498  
NOES 1983: HZD M1659; NIS 5; TNF 376; NOS 5; TNE 4359; TFE 1608  
EPA TSCA CHEMICAL INVENTORY, JUNE 1993  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, SEPTEMBER 1993

SECTION 16. - - - - - OTHER INFORMATION - - - - -

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ALDRICH SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL TERMS AND CONDITIONS OF SALE.

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-FAX: 028999742



DATE 8/11/94

MATERIAL SAFETY DATA SHEET

PAGE 1

SECTION I - GENERAL INFORMATION

CATALOG NO 48667 (REORDER PRODUCT BY THIS NO.)  
PRODUCT NAME BENZO(GHI)PERYLENE  
DATA SHEET NO I486670  
BENZO(GHI)PERYLENE  
FORMULA MIXTURE FORMULA WEIGHT  
CAS NRTECS  
SYNONYM ANALYTICAL STANDARD IN METHYLENE CHLORIDE  
MANUFACTURER SUPELCO INC. PHONE 814-359-3441  
ADDRESS SUPELCO PARK, BELLEFONTE, PA 16823-0048

SECTION II - HAZARDOUS INGREDIENTS OF MIXTURES

CHEMICAL NAME  
COMMON NAME - PERCENTAGE - CAS #  
(FORMULA) - PEL(UNITS) - TLV(UNITS)  
LD50 VALUE - CONDITIONS

BENZO(GHI)PERYLENE			
BENZO(GHI)PERYLENE	0.02		191-24-2
C23H14	N/A	N/A	
	SEE FOOTNOTE(4,9)		
METHANE, DICHLORO-			
METHYLENE CHLORIDE	99.98		75-09-2
CH2Cl2	500	50	PPM
2524	MG/KG	ORAL RAT	
	SEE FOOTNOTE(3,6,8)		

FOOTNOTES

- 3 CLASSIFIED BY IARC AS A CLASS 2B CARCINOGEN.
- 4 CLASSIFIED BY IARC AS A CLASS 3 CARCINOGEN.
- 6 SUBJECT TO THE REPORTING REQUIREMENTS OF SARA TITLE III, SECTION 313.
- 8 CLASSIFIED BY NTP AS A GROUP B CARCINOGEN.
- 9 THIS MATERIAL IS NOT LISTED ON THE TSCA (TOXIC SUBSTANCES CONTROL ACT) INVENTORY. THIS MATERIAL IS INTENDED FOR R&D USE ONLY AND MAY NOT BE USED FOR DRUG, HOUSEHOLD, OR OTHER PURPOSES. IT IS SUBJECT TO TSCA REGULATIONS AT CFR 40 PART 720.36 WHICH DEAL WITH THE EXEMPTION OF CHEMICALS USED IN RESEARCH AND DEVELOPMENT FROM PMN (PREMANUFACTURE NOTIFICATION) REQUIREMENTS. IN ADDITION, THE BURDEN OF SAFE USE OF THE MATERIAL RESTS WITH YOU AND, THEREFORE, IT SHOULD BE HANDLED ONLY BY QUALIFIED PERSONS TRAINED IN LABORATORY PROCEDURES AND GOOD SAFETY PRACTICES.

SECTION III - PHYSICAL DATA

BOILING POINT 40	C	MM	MELTING POINT -97	C
VAPOR PRESSURE 349	MM	20.0	C VAPOR DENSITY 2.93	20.0 C (AIR=1)
SPECIFIC GRAVITY 1.320	G/ML		C (WATER=1)	PERCENT VOLATILE BY VOLUME 100
WATER SOLUBILITY 1.6			EVAPORATION RATE 0.71	(ETHER=1)
APPEARANCE CLEAR COLORLESS LIQUID				
ODOR ETHER-LIKE ODOR				

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE LIMITS	LEL	12.0	UEL	19.0
EXTINGUISHING MEDIA					
WATER					

DATE 8/11/94

MATERIAL SAFETY DATA SHEET

PAGE 2

CATALOG NO 48667 (REORDER PRODUCT BY THIS NO.)  
PRODUCT NAME BENZO(GHI)PERYLENE  
DATA SHEET NO I486670  
BENZO(GHI)PERYLENE

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

\* CONTINUED \*

CO2  
DRY CHEMICAL

SPECIAL FIRE FIGHTING PROCEDURES

WEAR SELF CONTAINED BREATHING APPARATUS WHEN FIGHTING A CHEMICAL FIRE.

UNUSUAL FIRE AND EXPLOSION HAZARDS

THE FOLLOWING TOXIC VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.  
HYDROGEN CHLORIDE, PHOSGENE.

SECTION V - HEALTH HAZARD DATA

LD50	2524	MG/KG	ORAL RAT	TLV	50	PPM
PEL	500	PPM				

EMERGENCY AND FIRST AID PROCEDURES

EYES

FLUSH EYES WITH WATER FOR 15 MINUTES.

SKIN

PROMPTLY WASH SKIN WITH MILD SOAP AND LARGE VOLUMES OF WATER.  
REMOVE CONTAMINATED CLOTHING.

INHALATION

IMMEDIATELY MOVE TO FRESH AIR.  
GIVE OXYGEN IF BREATHING IS LABORED  
IF BREATHING STOPS, GIVE ARTIFICIAL RESPIRATION  
CONTACT A PHYSICIAN  
NEVER ADMINISTER ADRENALIN FOLLOWING CH2Cl2 EXPOSURE.  
INCREASED SENSITIVITY OF THE HEART TO ADRENALIN MAY BE CAUSED BY  
OVEREXPOSURE TO CH2Cl2.

INGESTION

NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON  
NEVER TRY TO MAKE AN UNCONSCIOUS PERSON VOMIT  
DO NOT INDUCE VOMITING.  
IMMEDIATELY CONTACT A PHYSICIAN.

EFFECTS OF OVEREXPOSURE

MAY BE FATAL IF INHALED  
HARMFUL IF SWALLOWED  
CONTAINS MATERIAL(S) KNOWN TO THE STATE OF CALIFORNIA TO

DATE 8/11/94

MATERIAL SAFETY DATA SHEET

PAGE 3

CATALOG NO 48667

(REORDER PRODUCT BY THIS NO.)

PRODUCT NAME BENZO(GHI)PERYLENE

DATA SHEET NO I486670

BENZO(GHI)PERYLENE

SECTION V - HEALTH HAZARD DATA

\* CONTINUED \*

CAUSE CANCER.

LACHRIMATION

IRRITATES SKIN

DERMATITIS

HEADACHE

DIZZINESS

NARCOSIS

LIVER DAMAGE

KIDNEY DAMAGE

SEVERAL CHRONIC INHALATION STUDIES REPORTED BY NIOSH REVEALED THAT TEST ANIMALS EXPOSED TO METHYLENE CHLORIDE CONCENTRATIONS AS HIGH AS 10,000PPM SHOWED SLIGHT LIVER & KIDNEY CHANGES. METHYLENE CHLORIDE HAS BEEN SHOWN TO INCREASE THE RATE OF SPONTANEOUSLY OCCURRING MALIGNANT TUMORS IN ONE STRAIN OF LABORATORY MICE & BENIGN TUMORS IN LABORATORY RATS. OTHER ANIMAL STUDIES, AS WELL AS SEVERAL HUMAN EPIDEMIOLOGY STUDIES, HAVE INDICATED A NEGATIVE RESPONSE. METHYLENE CHLORIDE IS NOT BELIEVED TO POSE A CARCINOGENIC RISK TO MAN WHEN HANDLED AS RECOMMENDED. METHYLENE CHLORIDE IS LISTED IN GROUP 2B BY IARC & NOT LISTED BY NTP OR OSHA.

CH<sub>2</sub>CL<sub>2</sub> IS METABOLIZED TO CO AND CAN STRESS THE CARDIOVASCULAR SYSTEM DUE TO INCREASED CARBOXYHEMOGLOBIN.

IN RATS METHYLENE CHLORIDE HAS BEEN SHOWN TO PRODUCE A SIGNIFICANT INCREASE IN SALIVARY GLAND TUMORS.

SECTION VI - REACTIVITY DATA

STABILITY STABLE.

CONDITIONS TO AVOID

N/A

INCOMPATIBILITY

STRONG BASES

OXIDIZING AGENTS

HAZARDOUS DECOMPOSITION PRODUCTS

HYDROGEN CHLORIDE, PHOSGENE.

HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

CONDITIONS TO AVOID

LIQUID OXYGEN OR OTHER STRONG OXIDANTS MAY FORM EXPLOSIVE MIXTURES

DATE 8/11/94

MATERIAL SAFETY DATA SHEET

PAGE 4

CATALOG NO 48667 (REORDER PRODUCT BY THIS NO.)  
PRODUCT NAME BENZO(GHI)PERYLENE  
DATA SHEET NO 1486670  
BENZO(GHI)PERYLENE

\* CONTINUED \*  
WITH METHYLENE CHLORIDE.  
THIS MATERIAL OR ITS VAPORS WHEN IN CONTACT WITH FLAMES, HOT GLOWING  
SURFACES OR ELECTRIC ARCS CAN DECOMPOSE TO FORM HYDROGEN CHLORIDE GAS  
AND TRACES OF PHOSGENE.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

TAKE UP WITH ABSORBENT MATERIAL.  
VENTILATE AREA.  
METHYLENE CHLORIDE VAPORS ARE HEAVIER THAN AIR AND WILL COLLECT IN LOW  
AREAS.

WASTE DISPOSAL METHOD

COMPLY WITH ALL APPLICABLE FEDERAL, STATE, OR LOCAL REGULATIONS

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFIC TYPE)

WEAR FACE MASK WITH ORGANIC VAPOR CANISTER.  
WEAR NIOSH/OSHA APPROVED RESPIRATORY PROTECTION.

PROTECTIVE GLOVES

WEAR NEOPRENE GLOVES.

EYE PROTECTION

WEAR PROTECTIVE GLASSES.

VENTILATION

USE ONLY IN WELL VENTILATED AREA.

SPECIAL

N/A

OTHER PROTECTIVE EQUIPMENT

N/A

SECTION IX - SPECIAL PRECAUTIONS

STORAGE AND HANDLING

STORE IN SEALED CONTAINER IN COOL, DRY LOCATION.

TWX 510-670-3600

DATE 8/11/94

MATERIAL SAFETY DATA SHEET

PAGE 5

CATALOG NO 48667

(REORDER PRODUCT BY THIS NO.)

PRODUCT NAME BENZO(GHI)PERYLENE

DATA SHEET NO 1486670

BENZO(GHI)PERYLENE

SECTION IX - SPECIAL PRECAUTIONS

\* CONTINUED \*

OTHER PRECAUTIONS

POSSIBLE CANCER HAZARD.

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LAST REVISED 12/22/92

DATE 8/18/94

MATERIAL SAFETY DATA SHEET

PAGE 1

SECTION I - GENERAL INFORMATION

CATALOG NO 48668 (REORDER PRODUCT BY THIS NO.)

PRODUCT NAME BENZO(K)FLUORANTHENE

DATA SHEET NO I486680

BENZO(K)FLUORANTHENE

FORMULA MIXTURE

FORMULA WEIGHT

CAS NRTECS

SYNONYM ANALYTICAL STANDARD IN METHYLENE CHLORIDE

MANUFACTURER SUPELCO INC. PHONE 814-359-3441

ADDRESS SUPELCO PARK, BELLEFONTE, PA 16823-0048

SECTION II - HAZARDOUS INGREDIENTS OF MIXTURES

CHEMICAL NAME

COMMON NAME - PERCENTAGE - CAS #

(FORMULA) - PEL(UNITS) - TLV(UNITS)

LD50 VALUE - CONDITIONS

BENZO(K)FLUORANTHENE

BENZO(K)FLUORANTHENE

C20H12

0.02

207-08-9

N/A

N/A

SEE FOOTNOTE(3,8,9)

METHANE, DICHLORO-

METHYLENE CHLORIDE

CH2Cl2

99.98

75-09-2

500

PPM

50

PPM

2524

MG/KG ORAL RAT

SEE FOOTNOTE(3,6,8)

FOOTNOTES

- 3 CLASSIFIED BY IARC AS A CLASS 2B CARCINOGEN.
- 6 SUBJECT TO THE REPORTING REQUIREMENTS OF SARA TITLE III, SECTION 313.
- 8 CLASSIFIED BY NTP AS A GROUP B CARCINOGEN.
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SECTION III - PHYSICAL DATA

BOILING POINT 40

C

MM MELTING POINT -97

C

VAPOR PRESSURE 349

MM

20.0

C

VAPOR DENSITY 2.93

20.0

C (AIR=1)

SPECIFIC GRAVITY 1.320

G/ML

C (WATER=1)

PERCENT VOLATILE BY VOLUME 100

WATER SOLUBILITY 1.6

EVAPORATION RATE 0.71

(ETHER=1)

APPEARANCE CLEAR COLORLESS LIQUID

ODOR ETHER-LIKE ODOR

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A

FLAMMABLE LIMITS LEL 12.0

UEL

19.0

EXTINGUISHING MEDIA

WATER

TWX 510-670-3600

DATE 8/18/94

MATERIAL SAFETY DATA SHEET

PAGE 2

CATALOG NO 48668 (REORDER PRODUCT BY THIS NO.)

PRODUCT NAME BENZO(K)FLUORANTHENE

DATA SHEET NO 1486680

BENZO(K)FLUORANTHENE

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

\* CONTINUED \*

C02

DRY CHEMICAL

## SPECIAL FIRE FIGHTING PROCEDURES

WEAR SELF CONTAINED BREATHING APPARATUS WHEN FIGHTING A CHEMICAL FIRE.

## UNUSUAL FIRE AND EXPLOSION HAZARDS

THE FOLLOWING TOXIC VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

HYDROGEN CHLORIDE, PHOSGENE.

SECTION V - HEALTH HAZARD DATA

LD50 2524

MG/KG

ORAL RAT

TLV 50

PPM

PEL 500

PPM

## EMERGENCY AND FIRST AID PROCEDURES

EYES

FLUSH EYES WITH WATER FOR 15 MINUTES.

SKIN

PROMPTLY WASH SKIN WITH MILD SOAP AND LARGE VOLUMES OF WATER.  
REMOVE CONTAMINATED CLOTHING.

INHALATION

IMMEDIATELY MOVE TO FRESH AIR.

GIVE OXYGEN IF BREATHING IS LABORED

IF BREATHING STOPS, GIVE ARTIFICIAL RESPIRATION

CONTACT A PHYSICIAN

NEVER ADMINISTER ADRENALIN FOLLOWING CH<sub>2</sub>Cl<sub>2</sub> EXPOSURE.INCREASED SENSITIVITY OF THE HEART TO ADRENALIN MAY BE CAUSED BY  
OVEREXPOSURE TO CH<sub>2</sub>Cl<sub>2</sub>.

INGESTION

NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON

NEVER TRY TO MAKE AN UNCONSCIOUS PERSON VOMIT

DO NOT INDUCE VOMITING.

IMMEDIATELY CONTACT A PHYSICIAN.

## EFFECTS OF OVEREXPOSURE

MAY BE FATAL IF INHALED

HARMFUL IF SWALLOWED

CONTAINS MATERIAL(S) KNOWN TO THE STATE OF CALIFORNIA TO

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MATERIAL SAFETY DATA SHEET

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CATALOG NO 48668

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DATA SHEET NO I486680

BENZO(K)FLUORANTHENE

SECTION V - HEALTH HAZARD DATA

\* CONTINUED \*

CAUSE CANCER.

LACHRIMATION

IRRITATES SKIN

DERMATITIS

HEADACHE

DIZZINESS

NARCOSIS

LIVER DAMAGE

KIDNEY DAMAGE

SEVERAL CHRONIC INHALATION STUDIES REPORTED BY NIOSH REVEALED THAT TEST ANIMALS EXPOSED TO METHYLENE CHLORIDE CONCENTRATIONS AS HIGH AS 10,000PPM SHOWED SLIGHT LIVER & KIDNEY CHANGES. METHYLENE CHLORIDE HAS BEEN SHOWN TO INCREASE THE RATE OF SPONTANEOUSLY OCCURRING MALIGNANT TUMORS IN ONE STRAIN OF LABORATORY MICE & BENIGN TUMORS IN LABORATORY RATS. OTHER ANIMAL STUDIES, AS WELL AS SEVERAL HUMAN EPIDEMIOLOGY STUDIES, HAVE INDICATED A NEGATIVE RESPONSE. METHYLENE CHLORIDE IS NOT BELIEVED TO POSE A CARCINOGENIC RISK TO MAN WHEN HANDLED AS RECOMMENDED. METHYLENE CHLORIDE IS LISTED IN GROUP 2B BY IARC & NOT LISTED BY NTP OR OSHA.

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IN RATS METHYLENE CHLORIDE HAS BEEN SHOWN TO PRODUCE A SIGNIFICANT INCREASE IN SALIVARY GLAND TUMORS.

SECTION VI - REACTIVITY DATA

STABILITY STABLE.

CONDITIONS TO AVOID

N/A

INCOMPATIBILITY

STRONG BASES

OXIDIZING AGENTS

HAZARDOUS DECOMPOSITION PRODUCTS

HYDROGEN CHLORIDE, PHOSGENE.

HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

CONDITIONS TO AVOID

LIQUID OXYGEN OR OTHER STRONG OXIDANTS MAY FORM EXPLOSIVE MIXTURES



DATE 8/18/94

MATERIAL SAFETY DATA SHEET

PAGE 4

CATALOG NO 48668 (REORDER PRODUCT BY THIS NO.)

PRODUCT NAME BENZO(K)FLUORANTHENE

DATA SHEET NO I486680

BENZO(K)FLUORANTHENE

\* CONTINUED \*

WITH METHYLENE CHLORIDE.

THIS MATERIAL OR ITS VAPORS WHEN IN CONTACT WITH FLAMES, HOT GLOWING SURFACES OR ELECTRIC ARCS CAN DECOMPOSE TO FORM HYDROGEN CHLORIDE GAS AND TRACES OF PHOSGENE.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

TAKE UP WITH ABSORBENT MATERIAL.

VENTILATE AREA.

METHYLENE CHLORIDE VAPORS ARE HEAVIER THAN AIR AND WILL COLLECT IN LOW AREAS.

WASTE DISPOSAL METHOD

COMPLY WITH ALL APPLICABLE FEDERAL, STATE, OR LOCAL REGULATIONS

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFIC TYPE)

WEAR FACE MASK WITH ORGANIC VAPOR CANISTER.

WEAR NIOSH/OSHA APPROVED RESPIRATORY PROTECTION.

PROTECTIVE GLOVES

WEAR NEOPRENE GLOVES.

EYE PROTECTION

WEAR PROTECTIVE GLASSES.

VENTILATION

USE ONLY IN WELL VENTILATED AREA.

SPECIAL

N/A

OTHER PROTECTIVE EQUIPMENT

N/A

SECTION IX - SPECIAL PRECAUTIONS

STORAGE AND HANDLING

STORE IN SEALED CONTAINER IN COOL, DRY LOCATION.

DATE 8/18/94

MATERIAL SAFETY DATA SHEET

PAGE 5

CATALOG NO 48668

(REORDER PRODUCT BY THIS NO.)

PRODUCT NAME BENZO(K)FLUORANTHENE

DATA SHEET NO I486680

BENZO(K)FLUORANTHENE

SECTION IX - SPECIAL PRECAUTIONS

\* CONTINUED \*

OTHER PRECAUTIONS

POSSIBLE CANCER HAZARD.

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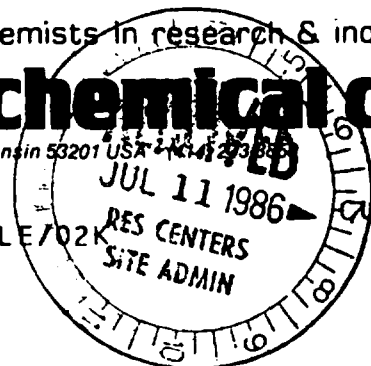


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ST LOUIS MO 63167



MONSANTO COMPANY  
INFORMATION CENTER  
CREVE COEUR

DATE: 07/02/86  
P.O. # 0016416  
CUST # 325902

M A T E R I A L   S A F E T Y   D A T A   S H E E T   PAGE: 1

IDENTIFICATION

PRODUCT # 12389-7   NAME: 2,2-BIS(4-CHLOROPHENYL)-1,1-DICHLORO-ETHYLENE, 99%  
CAS # 72-55-9

TOXICITY HAZARDS

RTECS # KV9450000

ETHYLENE, 1,1-DICHLORO-2,2-BIS(P-CHLOROPHENYL)-

TOXICITY DATA

ORL-RAT LD50: 880 MG/KG

TXAPA9 14,515,69

REVIEWS, STANDARDS, AND REGULATIONS

CARCINOGENIC REVIEW: ANIMAL POSITIVE IARC\*\* 5,83,74

NCI CARCINOGENESIS BIOASSAY COMPLETED; RESULTS POSITIVE: MOUSE (NCITR\*

NCI-CG-TR-131,79)

NCI CARCINOGENESIS BIOASSAY COMPLETED; RESULTS NEGATIVE: RAT (NCITR\*

NCI-CG-TR-131,78)

EPA GENETIC TOXICOLOGY PROGRAM, JANUARY 1984

MEETS CRITERIA FOR PROPOSED OSHA MEDICAL RECORDS RULE FEREAC 47,30420, 82

HEALTH HAZARD DATA

ACUTE EFFECTS

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.

MAY CAUSE IRRITATION.

CHRONIC EFFECTS

CARCINOGEN.

TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

FIRST AID

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.

IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION, PREFERABLY MOUTH-TO-MOUTH. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

CALL A PHYSICIAN.

DISCARD CONTAMINATED CLOTHING AND SHOES.

PHYSICAL DATA

MELTING POINT: 88 C TO 90 C

FIRE AND EXPLOSION HAZARD DATA

EXTINGUISHING MEDIA

WATER SPRAY.

CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.

SPECIAL FIRE FIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSION HAZARDS

NOT APPLICABLE

USA  
Aldrich Chemical Co., Inc.  
940 West Saint Paul Avenue  
Milwaukee, Wisconsin 53233  
Telephone: (414) 273-3050  
TWX: (910) 282-3052 Aldrichem MI  
Telex: 26 843 Aldrich MI  
FAX: (414) 273-4979

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8 Rue Caporal Claes  
B-1030 Brussels  
Telephone: (02) 3428750  
Telex: 82302 Alchem B

France  
Aldrich-Chemie S.a.r.l.  
27, Fosse des Treize  
F-67000 Strasbourg  
Telephone: (88) 327010  
Telex: 890078 Aldrich F  
FAX: (88) 75 12 83

Japan  
Aldrich Japan  
Kyodo Bldg. Shinkanda  
10 Kanda-Misuracho  
Chiyoda-Ku, Tokyo  
Telephone: (03) 258-0155  
FAX: (03) 258-0157

United Kingdom  
Aldrich Chemical Co., Ltd.  
The Old Brickyard, New Road  
Gillingham, Dorset SP8 4JL  
Telephone: (07478) 2211  
Telex: 417238 Aldrich G  
FAX: (07478) 3779

West Germany  
Aldrich-Chemie GmbH & Co. KG  
D-7824 Steinheim  
Telephone: (07328) 87-0  
Telex: 714836 Aldri D  
FAX: (07328) 87-39



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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

PAGE: 2

CATALOG # 12389-7

NAME: 2,2-BIS(4-CHLOROPHENYL)-1,1-DICHLORO-ETHYLENE, 99%

**----- REACTIVITY DATA -----**

**INCOMPATIBILITIES**

STRONG OXIDIZING AGENTS

STRONG BASES

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:

CARBON MONOXIDE, CARBON DIOXIDE

HYDROGEN CHLORIDE GAS

**----- SPILL OR LEAK PROCEDURES -----**

**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED**

EVACUATE AREA.

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY

RUBBER GLOVES.

WEAR DISPOSABLE COVERALLS AND DISCARD THEM AFTER USE.

SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.

VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

**WASTE DISPOSAL METHOD**

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

**--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---**

WEAR APPROPRIATE OSHA/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.

SAFETY SHOWER AND EYE BATH.

USE ONLY IN A CHEMICAL FUME HOOD.

DO NOT BREATHE DUST.

AVOID ALL CONTACT.

WASH THOROUGHLY AFTER HANDLING.

CARCINOGEN.

HARMFUL SOLID.

KEEP TIGHTLY CLOSED.

STORE IN A COOL DRY PLACE.

**----- ADDITIONAL PRECAUTIONS AND COMMENTS -----**

NOT APPLICABLE

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ALDRICH SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL TERMS AND CONDITIONS OF SALE.

USA  
Aldrich Chemical Co., Inc.  
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Yodokan-Mikuracho  
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West Germany  
Aldrich-Chemie GmbH & Co. KG  
D-7824 Sienheim  
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Telex: 714838 Aldri D  
FAX: (07329) 87-39

# Monsanto MATERIAL SAFETY DATA

Page 1 of 6

MONSANTO PRODUCT NAME

**Polychlorinated  
Biphenyls (PCBs)**

MONSANTO COMPANY  
800 N. LINDBERGH BLVD.  
ST. LOUIS, MO 63167

Emergency Phone No.  
(Call Collect)  
314-694-1000

Date: 10/88

## PRODUCT IDENTIFICATION

**Synonyms:** PCBs  
Chlorodiphenyl (\_\_\_% Cl)  
Chlorinated biphenyl  
Polychlorinated biphenyl  
Chlorinated biphenyls  
(approx. \_\_\_% Cl)

**Trade Names/**

**Common Names:** Aroclor<sup>®1</sup> Series 1016, 1221, 1232, 1242, 1248, 1254, 1260  
Therminol<sup>®1</sup> FR Series

PYRANOL<sup>®2</sup> and INERTEEN<sup>®3</sup> are trademarks for commonly used dielectric fluids that may have contained varying amounts of PCBs as well as other components including chlorinated benzenes.

ASKAREL - Generic name for a broad class of fire-resistant synthetic chlorinated hydrocarbons and mixtures used as dielectric fluids that commonly contained about 30-70% PCBs. Some ASKAREL fluids contained 99% or greater PCBs and some contained no PCBs.

This list of trade names is representative of several commonly used Monsanto products (or products formulated with Monsanto products). Other trademarked PCB products were marketed by Monsanto and other manufacturers. PCBs were also manufactured and sold by several European and Japanese companies. Contact the manufacturer of the trademarked product, if not in this listing, to determine if the formulation contained PCBs.

<sup>®1</sup> Registered trademark of Monsanto Company

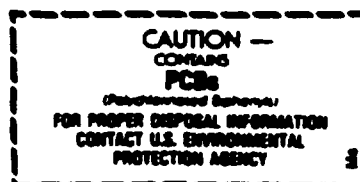
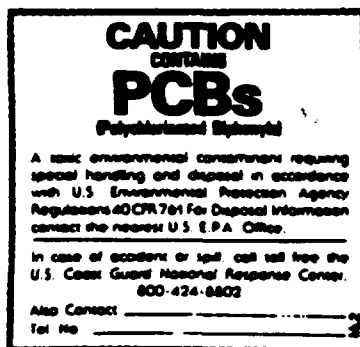
<sup>®2</sup> Registered trademark of General Electric Company

<sup>®3</sup> Registered trademark of Westinghouse Electric Corporation

**CAS No.'s:** 001336363, 053469219, 021672296, 01109769, 011096825 and others

## WARNING STATEMENTS

Federal regulations under the Toxic Substances Control Act require PCBs, PCB items, storage areas, transformer vaults, and transport vehicles to be marked. (check regulations, 40 CFR 761, for details)



MATERIAL SAFETY DATA. Polychlorinated Biphenyls (PCBs)

**PRECAUTIONARY MEASURES**

Care should be taken to prevent entry into the environment through spills, leakage, use, vaporization, or disposal of liquid or containers. Avoid prolonged breathing of vapors or mists. Avoid contact with eyes or prolonged contact with skin. If skin contact occurs, remove by washing with soap and water. Following eye contact, flush with water. In case of spillage onto clothing, the clothing should be removed as soon as practical, skin washed, and clothing laundered. Comply with all federal, state, and local regulations.

**EMERGENCY AND FIRST AID PROCEDURES**

- Ingestion:** Consult a physician. Do not induce vomiting or give any oily laxatives. NOTE TO PHYSICIAN—If large amounts are ingested, gastric lavage is suggested.
- Skin:** If liquid or solid PCBs are splashed or spilled on skin, contaminated clothing should be removed and the skin washed thoroughly with soap and water. NOTE TO PHYSICIAN—Hot PCBs may cause thermal burns.
- Eyes:** Eyes should be irrigated immediately with copious quantities of running water for at least 15 minutes if liquid or solid PCBs get into them. A petrolatum-based ophthalmic ointment may be applied to the eye to relieve the irritating effects of PCBs.
- Inhalation:** Remove to fresh air. If skin rash or respiratory irritation persists, consult a physician. NOTE TO PHYSICIAN—If electrical equipment arcs over, PCBs or other chlorinated hydrocarbon dielectric fluids may decompose to produce HCl, hydrochloric acid, a respiratory irritant.

**OCCUPATIONAL CONTROL PROCEDURES**

- Eye Protection:** Wear chemical splash goggles and have eye baths available where there is significant potential for eye contact.
- Skin Protection:** Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove for given application. Wear chemical goggles, face shield, and chemical resistant clothing such as a rubber apron when splashing is likely. Wash immediately if skin is contaminated. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling. **ATTENTION!** Repeated or prolonged contact may cause chloracne in some people.
- Respiratory Protection:** Avoid breathing vapor or mist. Use NIOSH/MSHA approved equipment when airborne exposure limits are exceeded. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical splash goggles. Consult respirator manufacturer to determine the type of equipment for a given application. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. High airborne concentrations may require use of self-contained breathing apparatus or supplied air respirator. Respiratory protection programs must be in compliance with 29 CFR Part 1910.134.
- Ventilation:** Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.
- Airborne Exposure Limits:** Chlorinated biphenyl (approximately 42% chlorine)  
 OSHA PEL: 1 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*  
 ACGIH TLV: 1 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*  
 2 mg/m<sup>3</sup> short-term exposure limit - Skin\*

\*Skin notation means that skin absorption of this material may add to the overall exposure. Avoid skin contact.

(OCCUPATIONAL CONTROL PROCEDURES continued on page 3)

Polychlorinated Biphenyls (PCBs)

MATERIAL SAFETY DATA

## OCCUPATIONAL CONTROL PROCEDURES (continued)

### Airborne

#### Exposure Limits (Continued):

Chlorinated biphenyl (approximately 54% chlorine)

OSHA PEL: 0.5 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*

ACGIH TLV: 0.5 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*

1 mg/m<sup>3</sup> short-term exposure limit - Skin\*

\*Skin notation means that skin absorption of this material may add to the overall exposure. Avoid skin contact.

## FIRE PROTECTION INFORMATION

### Fire and

#### Explosion:

PCBs are fire-resistant compounds. They may decompose to form CO, CO<sub>2</sub>, HCl, phenolics, aldehydes and other toxic combustion products under severe conditions such as exposure to flame or hot surfaces.

At temperatures in the range of 600-650°C in the presence of excess of oxygen PCBs may form polychlorinated dibenzofurans (PCDFs). Laboratory studies under similar conditions have demonstrated that PCBs do not produce polychlorinated dibenzo-p-dioxins (PCDDs).

PCBs in electrical equipment have been reported to produce both chlorinated dioxins (PCDDs) and furans (PCDFs) during fire situations. These combustion products may result all, or in part, from non-PCB components of the dielectric fluids or other combusted materials. Consult the equipment manufacturer for information regarding composition of the dielectric fluids in electrical apparatus.

Standard fire fighting wearing apparel and self-contained breathing apparatus should be worn when fighting fires that involve possible exposure to chemical combustion products. Fire fighting equipment should be thoroughly cleaned and decontaminated after use.

Federal regulations require all PCB transformers to be registered with fire response personnel.

If a PCB transformer is involved in a fire-related incident, the owner of the transformer may be required to report the incident. Consult and follow appropriate federal, state, and local regulations.

## REACTIVITY DATA

PCBs are very stable, fire-resistant compounds.

## HEALTH EFFECTS SUMMARY

### Skin Contact:

PCBs can be absorbed through intact skin. Local action on skin is similar to that of common organic solvents where contact leads to removal of natural fats and oils with subsequent drying and cracking of the skin. A potential exists for contracting chloracne.

### Eye Contact:

The liquid products and their vapors are moderately irritating to eye tissues.

### Ingestion:

The acute oral toxicities of the undiluted compounds are: LD<sub>50</sub> rats—8.65 gm/kg for 42% chlorinated, and 11.9 gm/kg for 54% chlorinated—"slightly toxic."

### Inhalation:

Animal experiments of varying duration and at different air concentrations show that for similar exposure conditions, the 54% chlorinated material produces more liver injury than the 42% chlorinated material.

(HEALTH EFFECTS SUMMARY continued on page 4)

## HEALTH EFFECTS SUMMARY (continued)

### Other:

There are literature reports that PCBs can impair reproductive functions in monkeys. The National Cancer Institute performed a study in 1977 using Aroclor 1254 with both sexes of rats. NCI stated that the PCB, Aroclor 1254, was not carcinogenic under the conditions of their bioassay. There is sufficient evidence in the scientific literature to conclude that Aroclor 1260 can cause liver cancer when fed to rodents at high doses. Similar experiments with less chlorinated PCB products have produced negative or equivocal results.

The consistent finding in animal studies is that PCBs produce liver injury following prolonged and repeated exposure by any route, if the exposure is of sufficient degree and duration. Liver injury is produced first, and by exposures that are less than those reported to cause cancer in rodents. Therefore, exposure by all routes should be kept sufficiently low to prevent liver injury.

Numerous epidemiological studies of humans, both occupationally exposed and non-worker environmentally exposed populations, have not demonstrated any causal relationship between PCB exposures and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs can cause dermatological symptoms; however, these are reversible upon removal of exposure source.

PCBs are identified as hazardous chemicals under criteria of the OSHA Hazard Communication Standard (29 CFR Part 1910.1200). PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Annual Report on Carcinogens (Fourth).

## PHYSICAL DATA

### PROPERTIES OF SELECTED AROCLORS\*

PROPERTY	1016	1221	1232	1242	1248	1254	1260
Color (APHA)	40	100	100	100	100	100	150
Physical state	mobile oil	mobile oil	mobile oil	mobile oil	mobile oil	viscous liquid	sticky resin
Stability	inert	inert	inert	inert	inert	inert	inert
Density (lb/gal 25°C)	11.40	9.85	10.55	11.50	12.04	12.82	13.50
Specific gravity x/15.5°C	1.36-1.37 x-25°	1.18-1.19 x-25°	1.27-1.28 x-25°	1.30-1.39 x-25°	1.40-1.41 x-65°	1.49-1.50 x-65°	1.55-1.56 x-90°
Distillation range (°C)	323-356	275-320	290-325	325-366	340-375	365-390	385-420
Acidity mg KOH/g. maximum	.010	.014	.014	.015	.010	.010	.014
Fire point (°C)	none to boiling point	176	238	none to boiling point	none to boiling point	none to boiling point	none to boiling point
Flash point (°C)	170	141-150	152-154	176-180	193-196	none	none
Vapor pressure (mm Hg @ 100°F)	NA	NA	0.005	0.001	0.00037	0.00006	NA
Viscosity (Saybolt Univ. Sec. @ 100°F) (centistokes)	71-81 13-16	38-41 3.6-4.6	44-51 5.5-7.7	82-92 16-19	185-240 42-52	1800-2500 390-540	— —

NA—Not Available

Polychlorinated Biphenyls (PCBs)

MATERIAL SAFETY DATA



## SPILL, LEAK & DISPOSAL INFORMATION

Cleanup and disposal of liquid PCBs and other PCB items are strictly regulated by the federal government. The regulations are found at 40 CFR Part 761. Consult these regulations as well as applicable state and local regulations prior to any disposal of PCBs, PCB items, or PCB-contaminated items.

If PCBs leak or are spilled, the following steps should be taken immediately:

All non-essential personnel should leave the leak or spill area.

The area should be adequately ventilated to prevent the accumulation of vapors.

The spill/leak should be contained. Loss to sewer systems, navigable waterways and streams should be prevented. Spills/leaks should be removed promptly by means of absorptive material, such as sawdust, vermiculite, dry sand, clay, dirt or other similar materials, or trapped and removed by pumping or other suitable means (traps, drip-pans, trays, etc.).

Personnel entering the spill or leak area should be furnished with appropriate personal protective equipment and clothing as needed. See Occupational Control Procedures section of this MSDS.

Personnel trained in the emergency procedures and protected against the attendant hazards should shut off sources of PCBs, clean up spills, control and repair leaks and fight fires in PCB areas.

All wastes and residues containing PCBs (e.g., wiping cloths, absorbent material, used disposable protective gloves, clothing, etc.) should be collected, placed in proper containers, marked and disposed of in the manner prescribed by EPA regulations (40 CFR Part 761) and applicable state and local regulations.

Various federal, state and local regulations may require immediate reporting of PCB spills and may also define spill clean-up levels. Consult your attorney or appropriate regulatory officials for information relating to spill reporting and spill clean-up.

## ENVIRONMENTAL INFORMATION

Care should be taken to prevent entry of PCBs into the environment through spills, leakage, use, vaporization or disposal of liquids or solids. PCBs can accumulate in the environment and can adversely affect some animals and aquatic life. In general, PCBs have low solubility in water, are strongly bound to soils and sediments, and are slowly degraded by natural processes in the environment.

## ADDITIONAL COMMENTS

### Polychlorinated Biphenyls

For regulatory purposes, under the Toxic Substances Control Act the term "PCBs" refers to a chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contain such substance (40 CFR Part 761).

Chemically, commercial PCBs are defined as a series of technical mixtures, consisting of many isomers and compounds that vary from mobile oily liquids to white crystalline solids and hard non-crystalline resins. Technical products vary in composition, in the degree of chlorination and possibly according to batch.

The mixtures generally used contain an average of 3 atoms of chlorine per molecule (42% chlorine) to 5 atoms of chlorine per molecule (54% chlorine). They are used as components of dielectric fluids in transformers and capacitors. Prior to 1972, PCB applications included heat transfer media, hydraulic and other industrial fluids, plasticizers, carbonless paper, paints, inks and adhesives.

In 1972 Monsanto restricted sales of PCBs to applications involving only closed electrical systems (transformers and capacitors). In 1977 all manufacturing and sales were voluntarily terminated. In 1979 EPA restricted the manufacture, processing, use, and distribution of PCBs to specifically exempted and authorized activities.

**DATE:** Issued 10/1/88 - reprinted - 10-92

**SUPERSEDES:** All prior to 10/1/88

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

John H. Craddock  
Product & Environmental Safety Director

Gary W. Mappes  
Product & Environmental Safety Manager

Environmental Policy Staff  
Monsanto Company  
800 North Lindbergh Boulevard  
St. Louis, Missouri 63167  
(314) 694-4764

Polychlorinated Biphenyls (PCBs)

MATERIAL SAFETY DATA

**Note:** Although the information and recommendations set forth (hereinafter "information") are presented in good faith and believed to be correct as of the date hereof, Monsanto Company makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purpose prior to use. In no event will Monsanto Company be responsible for damages of any nature whatsoever resulting from the use of or reliance upon information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

# **Monsanto**

## **MATERIAL SAFETY DATA**

**MATERIAL SAFETY DATA** **Polychlorinated Biphenyls (PCBs)**

# **Monsanto MATERIAL SAFETY DATA**

**Polychlorinated Biphenyls (PCBs)**

**MATERIAL SAFETY DATA**

103752

# Monsanto MATERIAL SAFETY DATA

Page 1 of 6

1/94

MONSANTO PRODUCT NAME  
MONOCHLOROBENZENE

MONSANTO COMPANY  
800 NO. LINDBERGH BLVD.  
ST. LOUIS, MO 63167

FOR CHEMICAL EMERGENCY, SPILL LEAK, FIRE, EXPOSURE, OR ACCIDENT  
Call CHEMTREC - Day or Night - 1-800-424-9300 Toll free in the continental U.S., Hawaii, Puerto Rico, Canada, Alaska, or Virgin Islands. For calls originating elsewhere: 202-483-7616 (collect calls accepted)

For additional non-emergency information, call: 314-694-2333

## PRODUCT IDENTIFICATION

Synonyms: Chlorobenzene; Phenyl Chloride; Monochlorobenzol; MCB

Chemical Name: Chlorobenzene

Chemical Formula: C6H5Cl

CAS No.: 108-90-7

TSCA Inventory: Chlorobenzene, (Monochlorobenzene) appears on the Inventory of Chemical Substances published by the U. S. Environmental Protection Agency (EPA) under authority of the Toxic Substances Control Act (TSCA).

Chemical Family: Chlorinated Aromatics

DOT Proper Shipping Name: Chlorobenzene

DOT Hazard Class/I.D. No./ Packing Group: 3/UN 1134/PG III

DOT Label(s): Flammable Liquid

Reportable Quantity (RQ) Under U.S. EPA CERCLA and DOT Regulations: Chlorobenzene, 100 lbs (45.4 kg)

103752

### SARA Hazard Notification

Hazard Categories Under Criteria  
of SARA Title III Rules  
(40 CFR Part 370):

Immediate, Fire, Delayed

### Section 313 Toxic Chemical(s):

This product contains the following substance(s) which are defined as toxic chemicals under, and subject to the reporting requirements of, Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

Toxic Chemical Name	Chemical Abstract Service Registry Number	Percent by Weight in Product
Chlorobenzene	108-90-7	99.9%

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## PRODUCT IDENTIFICATION - CONTINUED

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Hazardous Chemical(s) Under OSHA Hazard Communication Standard:

This substance is identified as a hazardous chemical under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

---

## WARNING STATEMENTS

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### WARNING!

FLAMMABLE LIQUID AND VAPOR

CAUSES EYE, SKIN AND RESPIRATORY TRACT IRRITATION

MAY CAUSE LIVER AND KIDNEY DAMAGE BASED ON ANIMAL DATA

---

## PRECAUTIONARY MEASURES

---

Keep away from heat, sparks, and flame.

Avoid breathing vapor or mist.

Avoid contact with eyes, skin and clothing.

Wash thoroughly after handling.

Keep container closed.

Use with adequate ventilation.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned or reconditioned. DO NOT CUT OR WELD ON OR NEAR CONTAINER.

---

## EMERGENCY AND FIRST AID PROCEDURES

---

FIRST AID: IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Get medical attention.

IF ON SKIN, immediately flush with plenty of water. Remove contaminated clothing. Get medical attention. Wash clothing before reuse.

IF INHALED, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. Remove material from eye, skin, and clothing.

IN CASE OF FIRE, use water spray, foam, CO2, dry chemical or any Class B extinguishing agent.

IN CASE OF SPILL OR LEAK, Keep people away. Shut off leak if without risk. For small spills, keep upwind. For large spills, evacuate area. If necessary to enter spill area, wear self-contained breathing apparatus and full protective clothing including boots. For large spills, dike and pump into salvage tank. Use water spray to knock down vapors. Soak up with sand or earth; sweep up or shovel into clean metal containers. Run-off to sewers may create health and explosion hazards; notify fire, health, and pollution control authorities.

---

## OCCUPATIONAL CONTROL PROCEDURES

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Eye Protection: Where there is significant potential for eye contact, wear chemical goggles and have eye flushing equipment available.

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## OCCUPATIONAL CONTROL PROCEDURES - CONTINUED

---

**Skin Protection:** Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove for given application. Wash contaminated skin promptly. Launder contaminated clothing and clean protective equipment before reuse. Wash thoroughly after handling.

**Respiratory Protection:** Avoid breathing vapor. Use NIOSH/MSHA approved respiratory protection equipment (full facepiece recommended) when airborne exposure limits are exceeded (see below). If used, full facepiece replaces need for face shield and/or chemical goggles. Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer. Respiratory protection programs must comply with 29 CFR § 1910.134.

**Ventilation:** Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult NFPA Standard 91 for design of exhaust systems.

### Airborne Exposure Limits

MONOCHLOROBENZENE (wt. %, 99.9)

OSHA PEL/TWA:	75 ppm (350 mg/m <sup>3</sup> ) 8-Hour TWA
ACGIH TLV/TWA:	75 ppm (345 mg/m <sup>3</sup> ) 8-Hour TWA

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## FIRE PROTECTION INFORMATION

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Flash Point:	82°F	Method:	Pensky-Martens Closed Cup
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Flammable Limits:	Lower 1.3% by volume in air
	Upper 9.6% by volume in air

Autoignition Temperature: 1099°F

**Extinguishing Media:** Water spray, foam, CO<sub>2</sub>, dry chemical or any Class B extinguishing agent. Use water spray to keep exposed containers and equipment cool.

**Special Fire Fighting Procedures:** Fire fighters and others who may be exposed to vapors or products of combustion should wear self-contained breathing apparatus and full protective clothing. All equipment should be thoroughly decontaminated after use.

**Unusual Fire and Explosion Hazards:** Vapors are heavier than air and can travel a considerable distance to an ignition source and flashback.

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## REACTIVITY DATA

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**Stability:** Product is stable under ordinary conditions of storage and handling. Product has a low flash point and is easily ignited.

**Materials to Avoid:** Strong oxidizing agents

**Hazardous Decomposition Products:** No uniquely hazardous decomposition products are expected. If the product is burned, carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), smoke, soot, chlorides, and chlorine may be produced.

**Hazardous Polymerization:** Does not occur

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## HEALTH EFFECTS SUMMARY

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The following information summarizes human experience and results of scientific investigations reviewed by health professionals for hazard evaluation of monochlorobenzene and development of Precautionary Statements and Occupational Control Procedures recommended in this document.

### Effects of Exposure

Skin contact and inhalation are expected to be the primary routes of occupational exposure to monochlorobenzene. This material is considered, on the basis of single exposure animal studies, to be moderately irritating to the eyes and skin. Excessive exposure to monochlorobenzene vapors has been reported to cause irritation of the eyes and respiratory tract of exposed individuals. Overexposure to monochlorobenzene vapors may also result in digestive disorders and central nervous system (CNS) effect with possible effects such as giddiness, loss of coordination, drowsiness, headache, nausea, loss of consciousness and, with extreme overexposure, coma or death. Toxicity studies indicate that high doses of monochlorobenzene produce liver and kidney injury in laboratory animals.

### Toxicological Data

Data from laboratory studies conducted by Monsanto and from the scientific literature with monochlorobenzene (MCB) are summarized below.

Single exposure (acute) studies indicate:

Oral -	Slightly Toxic	(Rat LD50 1,540 mg/kg)
Dermal -	Practically Nontoxic	(Rabbit LD50 >7,940 mg/kg)
Inhalation -		(Male Mouse 5-minute RD50 1,054 ppm)
Eye Irritation -	Moderately Irritating	(Rabbit, 16.3/110.0)
Skin Irritation -	Moderately Irritating	(Rabbit, 24-hr exposure, 3.0/8.0)
Vapor Inhalation -	6 out of 6 rats died during exposure to MCB at a concentration of 39.7 mg/l for 3.75 hours.	

Repeated inhalation studies (4-24 weeks) with MCB, conducted in small laboratory animals (rats, mice, guinea pigs, rabbits), have resulted in liver, kidney, adrenal gland and lung changes at high exposure levels. Vomiting and abnormal stools were noted following repeated inhalation (6-month) of MCB by beagle dogs. In repeat oral dosing studies (13-weeks), rodents given MCB exhibited changes in body weight, some organ weights and in clinical parameters with injury to liver, kidney and lymphoid tissues. Oral dosing of MCB in dogs for a similar period resulted in increased salivation, growth depression, changes in clinical parameters, and injury to liver, kidney, gastrointestinal mucosa and blood forming tissues, at a dosage which produced significant deaths. Single and repeated inhalation exposures to MCB had no effect of the likelihood of female mice to develop respiratory infection.

In long-term oral dosing studies with rats and mice (2-year) conducted by the National Toxicology Program (NTP), reduced survival and a slight increase in the occurrence of neoplastic nodules of the liver were noted in high-dose male rats. No treatment-related signs of toxicity or increase in tumors were found in female rats or in male or female mice.

No birth defects were noted in rats given MCB orally during pregnancy or in rats exposed to MCB by inhalation during pregnancy at levels which produced adverse effects on the mothers and their offspring. A few malformations (visceral) were observed in rabbits exposed to MCB by inhalation during pregnancy at levels which produced adverse effects on the mothers. Because no dose-response relationship was apparent and these findings could not be reproduced in a second study under similar conditions, these findings are not considered indicative of a teratogenic response to MCB. No effects were seen on the ability of male or female rats to reproduce when exposed by inhalation to MCB for 2 successive generations; liver, kidney and testicular changes were observed in adult male rats.

MCB has generally produced no genetic changes in standard tests using flies (*Drosophila*), and animal, bacterial or yeast cells. Positive responses were reported in two assays using animal cells. In a separate study, single intraperitoneal doses of MCB were reported to produce a clastogenic effect in mice. MCB has also been shown to bind to nucleic acids and tissue proteins in rodents.



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## HEALTH EFFECTS SUMMARY - CONTINUED

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### Additional Information

A Threshold Limit Value (TLV) has been established by the American Conference of Governmental Industrial Hygienists for MCB (chlorobenzene). For further information on this material, please refer to the current edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices.

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## PHYSICAL DATA

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Appearance:	Colorless liquid
Odor:	Penetrating characteristic odor of almonds
Boiling Point:	132.1°C (270°F)
Vapor Density (Air=1):	3.86
Melting Point:	-45.2°C (-47°F)
Specific Gravity @ 20°/4°C:	1.107
Solubility in Water @ 20°C, % by wt.:	0.049%
Viscosity @20° C:	0.799 cp
Vapor Pressure @ 25° C (mm Hg):	11.8
@ 104° C (estimated mm Hg)	332.6 mm Hg

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

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## SPILL, LEAK, & DISPOSAL INFORMATION

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Emergency Spill and Leak Information: Keep people away. Shut off or extinguish all sources of ignition. Shut off leak if without risk. For small spills, keep upwind. For large spills, evacuate area. If there is the potential for exposure to vapors, wear self-contained breathing apparatus and full protective clothing including boots. Since there is always the potential for ignition of vapors, stay a safe distance from the liquid spill and upwind if the spill is outdoors. For large spills, dike area and seal liquid surface with a compatible foam until transfer into a salvage tank can be arranged. Water spray may be effective in dispersing vapors or diverting vapors in a direction of less potential hazard. Soak up with sand or earth; sweep up or shovel into clean metal containers. Run-off to sewers may create health and explosion hazards; notify fire, health and pollution control authorities.

Release of more than 100 pounds to the environment in a 24-hour period requires notification to the National Response Center, 1-800-424-8802. Notification of state or local authorities may also be required.

Disposal Information: This product can become a hazardous waste as designated by the Environmental Protection Agency under authority of the Resource Conservation and Recovery Act (RCRA). Product (or waste) has EPA Hazardous Waste Number U037 as designated in 40 CFR 261.33(f). Waste containing this product may also be ignitable (EPA Hazardous Waste Number D001). This material is subject to the RCRA Land Disposal Restrictions of 40 CFR 268. Disposal by incineration in a RCRA incinerator is Best Demonstrated Available Treatment (BDAT). All federal, state, and local regulations should be followed.

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## ENVIRONMENTAL EFFECTS

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### Environmental Toxicity Information:

Data from Monsanto studies and from the scientific literature indicate the following:

48-hr EC50 <u>Daphnia magna</u> :	19.9 mg/l, Slightly Toxic
96-hr LC50 Sheepshead Minnow:	10 ppm, Moderately Toxic
96-hr LC50 Bluegill Sunfish:	16 mg/l, Slightly Toxic

In a seven-day bioconcentration study with MCB in bluegill sunfish, the bioconcentration potential was considered to be negligible.

Monochlorobenzene was evaluated in River Die-Away biodegradability test. CO<sub>2</sub> evolution was approximately 20.5%. Biodegradability was classified as slow.

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DATE: 1/10/94

SUPERSEDES: 7/10/92

MSDS NUMBER 000108907

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DATE: 02/04/94 ACCT: 553175-01  
INDEX: 02940346217 CAT NO: 045864 PD NBR: RC15-0106-4

\*\*TETRACHLOROETHYLENE\*\*  
\*\*TETRACHLOROETHYLENE\*\*  
\*\*TETRACHLOROETHYLENE\*\*

#### MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC  
CHEMICAL DIVISION  
1 REAGENT LANE  
FAIR LAWN NJ 07410  
(201) 796-7100

EMERGENCY NUMBER: (201) 796-7100  
CHEMTREC ASSISTANCE: (800) 424-9300

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#### SUBSTANCE IDENTIFICATION

SUBSTANCE: \*\*TETRACHLOROETHYLENE\*\* CAS-NUMBER 127-18-4

TRADE NAMES/SYNONYMS:  
PERCHLOROETHYLENE; 1,1,2,2-TETRACHLOROETHYLENE; NEMA;  
ETHYLENE TETRACHLORIDE; CARBON DICHLORIDE; PERCLEN; PERC; PCE;  
TETRACHLOROETHYLENE; PERCHLOROETHYLENE; TETRACAP; TETRACHLOROETHENE; DIDAKENE;  
RCRA U210; NCI-C04580; ENT 1,860; 04586; C182; STCC 4940355; UN 1897; C2CL4;  
AC222900

CHEMICAL FAMILY:  
Halogen compound, aliphatic

MOLECULAR FORMULA: CL<sub>2</sub>-C-C-CL<sub>2</sub>

MOLECULAR WEIGHT: 165.83

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=2  
NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=0 REACTIVITY=0

#### COMPONENTS AND CONTAMINANTS

COMPONENT: TETRACHLOROETHYLENE PERCENT: 100.0  
CAS# 127-18-4

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:  
TETRACHLOROETHYLENE (PERCHLOROETHYLENE):  
25 ppm (170 mg/m<sup>3</sup>) OSHA TWA  
25 ppm (170 mg/m<sup>3</sup>) ACGIH TWA; 100 ppm (685 mg/m<sup>3</sup>) ACGIH STEL  
ACGIH A3-Animal Carcinogen  
Lowest feasible limit NIOSH recommended exposure criteria  
50 ppm (339 mg/m<sup>3</sup>) DFG MAK TWA;  
100 ppm (678 mg/m<sup>3</sup>) DFG MAK 30 minute peak, average value, 4 times/shift

Measurement method: Charcoal tube; carbon disulfide; gas chromatography with  
flame ionization detection; (NIOSH Vol. III # 1003, Halogenated  
Hydrocarbons).

100 pound CERCLA Section 103 Reportable Quantity  
Subject to SARA Section 313 Annual Toxic Chemical Release Reporting  
Subject to California Proposition 65 cancer and/or reproductive toxicity  
warning and release requirements- (April 1, 1988)

\*\*OSHA revoked the final rule limits of January 19, 1989 in response to the  
11th Circuit Court of Appeals decision (AFL-CIO v. OSHA) effective  
June 30, 1993. See 29 CFR 1910.1000 (58 FR 35338)\*\*

#### PHYSICAL DATA

DESCRIPTION: Clear, colorless, volatile liquid with a mild ether-like odor.

BOILING POINT: 250 F (121 C) MELTING POINT: -2 F (-19 C)

SPECIFIC GRAVITY: 1.8227 VAPOR PRESSURE: 14 mmHg @ 20 C

EVAPORATION RATE: (butyl acetate=1) 2.8 SOLUBILITY IN WATER: 0.015%

ODOR THRESHOLD: 50 ppm VAPOR DENSITY: 5.83

SOLVENT SOLUBILITY: Soluble in alcohol, ether, benzene, chloroform, oils

#### FIRE AND EXPLOSION DATA

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FIRE AND EXPLOSION HAZARD:  
Negligible fire hazard when exposed to heat or flame.

#### FIREFIGHTING MEDIA

Dry chemical or carbon dioxide  
(1990 Emergency Response Guidebook, DOT P 5800.5)

For larger fires, use water spray, fog or regular foam  
(1990 Emergency Response Guidebook, DOT P 5800.5)

#### FIREFIGHTING:

Apply cooling water to sides of containers that are exposed to flames until  
well after fire is out. Stay away from ends of tanks. Isolate for 1/2 mile in  
all directions if tank, rail car or tank truck is involved in fire (1990  
Emergency Response Guidebook, DOT P 5800.5, Guide Page 74).

Extinguish using agent(s) suitable for type of surrounding fire. Avoid  
contamination of water sources and sewers. Build dikes to contain flow. Avoid  
breathing vapors; keep upwind.

#### TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:  
ORM-A

Department of Transportation labeling requirements 49 CFR 172.101 and  
SUBPART E:  
None

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49 CFR 173.605  
EXCEPTIONS: 49 CFR 173.505

Final rule on hazardous materials regulations (HMR, 49 CFR parts 171-180),  
docket numbers HM-181, HM-181a, HM-181b, HM-181c, HM-181d and HM-204  
Effective date October 1, 1991. However, compliance with the regulations is  
authorized on and after January 1, 1991. (55 FR 52402, 12/21/90)

Except for explosives, inhalation hazards, and infectious substances, the  
effective date for hazard communication requirements is extended to  
October 1, 1993. (56 FR 47158, 09/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101  
Tetrachloroethylene-UN 1897

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101  
6.1 - Poisonous materials

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101  
PG III

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101  
AND SUBPART E:  
Keep away from food

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS  
EXCEPTIONS: 49 CFR 173.153  
NON-BULK PACKAGING: 49 CFR 173.203  
BULK PACKAGING: 49 CFR 173.241

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101  
PASSENGER AIRCRAFT OR RAILCAR: 60 l  
CARGO AIRCRAFT ONLY: 220 l

#### TOXICITY

TETRACHLOROETHYLENE (PERCHLOROETHYLENE):

IRRITATION DATA: 810 mg/24 hours skin rabbit severe; 500 mg/24 hours  
skin rabbit mild; 162 mg eye rabbit mild; 500 mg/24 hours eye rabbit mild  
TOXICITY DATA: 96 ppm/7 hours inhalation-human TCLO; 600 ppm/10 minutes  
inhalation-man TCLO; 34,200 mg/m<sup>3</sup>/8 hours inhalation-rat LC50; 5200 ppm/4  
hours inhalation-mouse LC50; 10,000 mg/kg skin-rabbit LD50 (Dow MSDS);  
545 mg/kg oral-child TDLO; 2629 mg/kg oral-rat LD50; 8100 mg/kg oral-mouse  
LD50; 5 gm/kg oral rabbit LDLo; 4 gm/kg oral-cat LDLo; 4 gm/kg oral dog  
LDLo; 2200 mg/kg subcutaneous-rabbit LDLo; 65 gm/kg subcutaneous mouse LD50;  
85 mg/kg intravenous-dog LDLo; 4678 mg/kg intraperitoneal-rat LD50;  
2100 mg/kg intraperitoneal-dog LD50; mutagenic data (RTECS); reproductive  
effects data (RTECS); tumorigenic data (RTECS).

CARCINOGEN STATUS: Anticipated Human Carcinogen (NTP); Human Inadequate  
Evidence, Animal Sufficient Evidence (IARC Group-2B) In mice, oral  
administration and inhalation produced hepatocellular carcinomas in both  
sexes. Exposure of rats by inhalation produced an increased incidence of  
mononuclear cell leukemia in both sexes.

LOCAL EFFECTS: Irritant- inhalation, skin, eyes

ACUTE TOXICITY LEVEL: Moderately toxic by inhalation, ingestion, slightly  
toxic by dermal absorption.

TARGET EFFECTS: Central nervous system depressant. Poisoning may also affect

the liver and kidneys.  
AT INCREASED RISK FROM EXPOSURE: Persons with pre-existing skin, eye, liver, kidney, cardiovascular or neurological disorders.  
ADDITIONAL DATA: Alcohol may enhance the toxic effects. Stimulants such as epinephrine may induce ventricular fibrillation. May be excreted in breast milk. One study shows an increased risk of leukemia for children whose fathers had occupational exposure to chlorinated solvents after the birth of the child.

HEALTH EFFECTS AND FIRST AID

INHALATION:  
TETRACHLOROETHYLENE (PERCHLOROETHYLENE):  
IRRITANT/NARCOTIC/CARCINOGEN

ACUTE EXPOSURE- Vapor concentrations from 100-400 ppm may cause irritation of the nose, throat and mucous membranes, flushed face and neck, sinus congestion, nasal discharge, headache, dizziness, lightheadedness, drowsiness, thick tongue, tightness around the mouth, slurred speech, confusion, incoordination, nausea, and reversible liver and kidney changes; 400-600 ppm may cause salivation, metallic taste, perspiration of the hands, and loss of inhibitions; 1000-2000 ppm may cause marked upper respiratory irritation, anesthesia of the lips and nose, congested eustachian tubes, aching facial muscles, inebriation, exhilaration, mental sluggishness, lassitude, gagging, faintness, tinnitus, dyspnea upon exertion, narcosis, and liver and kidney damage. Other reported symptoms include weakness, ataxia, coughing, chest pains, rapid, weak pulse, blurred vision, irritability, anorexia, vomiting, hallucinations, distorted perceptions, acidosis, latent jaundice and abnormal liver function tests, albuminuria, hematuria, anuria, and premature ventricular beats. Massive exposures may cause pulmonary edema, unconsciousness, coma and death from anesthesia or respiratory arrest. In one fatal case, pathologic findings included central fatty necrosis and fatty infiltration of the liver and moderate cloudy swelling of the renal tubular epithelium. Epinephrine-induced cardiac arrhythmias have occurred with some hydrocarbons, but testing of tetrachloroethylene in dogs has been negative.

CHRONIC EXPOSURE- Workers exposed to 1-40 ppm over 7.5 years showed altered electrodiagnostic and neurological rating scores; 4 of 16 exposed to 60-450 ppm for 2-20 years had abnormal EEG's. Repeated exposure may also cause respiratory tract irritation, central nervous system depression without narcosis, confusion, headache, fatigue, dizziness, inebriation, insomnia, nausea, anorexia, abdominal pain, constipation, blurred vision, multiple premature ventricular beats, and peripheral neuropathy with numbness in the fingers, trembling, neuritis, and memory defects. Hepatic damage may occur and be persistent. Exposure to levels around 250 ppm for 4 months has been reported to have caused hemoptysis, coughing, sweating attacks, jaundice, oliguria, hematemesis, cardiovascular failure and death. Occasional idiosyncratic reactions have been reported including pulmonary edema, bronchial asthma, dependency, and hypersensitivity. Chronic studies in rats have produced liver and kidney damage. In studies of women working in the dry cleaning industry, one study showed higher incidences of menstrual disorders, indicating an effect on the hormone system. Another study revealed an association between exposure during early pregnancy and a significantly increased incidence of spontaneous abortions. Reproductive effects have also been reported in animals. Inhalation studies indicate an increased incidence of liver carcinomas in mice and mononuclear cell leukemia in rats.

FIRST AID- Remove from exposure area to fresh air immediately. If breathing has stopped, give artificial respiration. Maintain airway and blood pressure and administer oxygen if available. Keep affected person warm and at rest. Treat symptomatically and supportively. Administration of oxygen should be performed by qualified personnel. Get medical attention immediately.

SKIN CONTACT:  
TETRACHLOROETHYLENE (PERCHLOROETHYLENE):  
IRRITANT

ACUTE EXPOSURE- Brief immersion of the hands in the liquid usually causes only mild irritation. However, the liquid on the skin for 40 minutes resulted in a progressively severe burning sensation, beginning within 5-10 minutes, and marked erythema, which subsided after 1-2 hours. Severe exposures may result in vesiculation and possibly burns. Absorption may occur but is probably not a significant route of exposure.  
CHRONIC EXPOSURE- Repeated or prolonged skin contact may produce dermatitis with dry, scaly, fissured skin.

FIRST AID- Remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water until no evidence of chemical remains (approximately 15-20 minutes). Get medical attention immediately.

EYE CONTACT:  
TETRACHLOROETHYLENE (PERCHLOROETHYLENE):  
IRRITANT

ACUTE EXPOSURE- Vapor concentrations from 100-200 may cause mild irritation. Higher levels or direct contact may cause pain, lacrimation, and burning, but serious injury is unlikely. At 1500 ppm, the irritation is almost

intolerable. Two studies of direct application to rabbit eyes resulted in conjunctivitis and effects on the corneal epithelium; recovery was complete in 2 days to 2 weeks.  
CHRONIC EXPOSURE- Repeated or prolonged exposure may cause conjunctivitis. One study has reported an increased incidence of lacrimal duct disease in exposed workers.

FIRST AID- Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains (approximately 15-20 minutes). Get medical attention immediately.

INGESTION:  
TETRACHLOROETHYLENE (PERCHLOROETHYLENE):  
NARCOTIC/CARCINOGEN

ACUTE EXPOSURE- May cause severe gastrointestinal irritation with nausea, vomiting, abdominal cramps and diarrhea, possibly with bloody stools. Narcotic effects may include headache, dizziness, exhilaration, inebriation and other effects as in acute inhalation. A dose of 500 mg/kg was ingested and survived. Dogs given lethal doses exhibited cardiac and respiratory depression; autopsy revealed fatty infiltration of the heart and liver and marked inflammation and shriveling of the small intestine.  
CHRONIC EXPOSURE- Long-term ingestion of 50 mg/kg produced liver and kidney damage in mice. Chronic ingestion has produced hepatocellular carcinomas in mice.

FIRST AID- Remove by gastric lavage or emesis. Maintain blood pressure and airway. Give oxygen if respiration is depressed. Do not perform gastric lavage or emesis if victim is unconscious. Get medical attention immediately (Dreisbach, Handbook of Poisoning, 12th Ed.). Administration of gastric lavage or oxygen should be performed by qualified medical personnel.

ANTIDOTE:  
No specific antidote. Treat symptomatically and supportively.

REACTIVITY

REACTIVITY:  
Stable under normal temperatures and pressures.

INCOMPATIBILITIES:  
TETRACHLOROETHYLENE (PERCHLOROETHYLENE):  
ALUMINUM: May form explosive mixture.  
BARIUM: Forms a detonable mixture.  
BASES: May form explosive mixture.  
BERYLLIUM: Possible explosive mixture.  
DINITROGEN TETRAOXIDE: Explosive when subjected to extreme shock  
METALS (LIGHT): Violent reaction  
OXYGEN (LIQUID): Incompatible.  
PLASTICS, RUBBER, AND COATINGS: May be attacked.  
POTASSIUM HYDROXIDE: May form explosive mixture.  
SODIUM HYDROXIDE: May form explosive mixture.

DECOMPOSITION:  
Thermal decomposition products may include highly toxic fumes of phosgene, toxic and corrosive fumes of chlorides, and oxides of carbon.

POLYMERIZATION:  
Hazardous polymerization has not been reported to occur under normal temperatures and pressures.

STORAGE AND DISPOSAL

Observe all federal, state and local regulations when storing or disposing of this substance.

\*\*Storage\*\*

Store in a cool, dry, well-ventilated location, away from any area where the fire hazard may be acute (NFPA 49, Hazardous Chemicals Data, 1975).

Store away from incompatible substances.

\*\*Disposal\*\*

Disposal must be in accordance with standards applicable to generators of hazardous waste, 40CFR 262, EPA Hazardous Waste Number U210.

Tetrachloroethylene - Regulatory level, 0.7 mg/l (TCLP-40 CFR 261 Appendix II) materials which contain the above substance at or above the TCLP regulatory level meet the EPA toxicity characteristic, and must be disposed of in accordance with 40 CFR part 262, EPA Hazardous Waste Number D039.

CONDITIONS TO AVOID

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May burn but does not ignite readily. Container may explode in heat of fire.

\*\*\*\*\*  
SPILL AND LEAK PROCEDURES

**SOIL SPILL:**  
Dig a holding area such as a pit, pond or lagoon to contain spill and dike surface flow using barrier of soil, sandbags, foamed polyurethane or foamed concrete. Absorb liquid mass with fly ash or cement powder.

**WATER SPILL:**  
Use activated carbon to absorb spilled substance that is dissolved.

Use suction hoses to remove trapped spill material.

The California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) prohibits contaminating any known source of drinking water with substances known to cause cancer and/or reproductive toxicity.

**OCCUPATIONAL SPILL:**  
Shut off ignition sources. Stop leak if you can do it without risk. For small liquid spills, take up with sand, earth or other absorbent material. For larger spills, dike far ahead of spill for later disposal. No smoking, flames or flares in hazard area! Keep unnecessary people away.

**Reportable Quantity (RQ):** 1 pound  
The Superfund Amendments and Reauthorization Act (SARA) Section 304 requires that a release equal to or greater than the reportable quantity for this substance be immediately reported to the local emergency planning committee and the state emergency response commission (40 CFR 355.40). If the release of this substance is reportable under CERCLA Section 103, the National Response Center must be notified immediately at (800) 424-8802 or (202) 426-2675 in the metropolitan Washington, D.C. area (40 CFR 302.6).

-----  
PROTECTIVE EQUIPMENT

**VENTILATION:**  
Process enclosure recommended to meet published exposure limits.

**RESPIRATOR:**  
The following respirators and maximum use concentrations are recommendations by the U.S. Department of Health and Human Services, NIOSH Pocket Guide to Chemical Hazards; NIOSH criteria documents or by the U.S. Department of Labor, 29 CFR 1910 Subpart Z.  
The specific respirator selected must be based on contamination levels found in the work place, must not exceed the working limits of the respirator and be jointly approved by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH-MSHA).

**TETRACHLOROETHYLENE:**

At any detectable concentration:

Self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode.  
Supplied-air respirator with full facepiece operated in pressure-demand or other positive pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.

Escape- Air-purifying full facepiece respirator (gas mask) with a chin-style, front- Or back-mounted organic vapor canister.  
Any appropriate escape-type, self-contained breathing apparatus.

**FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:**

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

**CLOTHING:**  
Employee must wear appropriate protective (impervious) clothing and equipment to prevent repeated or prolonged skin contact with this substance.

**GLOVES:**  
Employee must wear appropriate protective gloves to prevent contact with this substance.

**EYE PROTECTION:**  
Employee must wear splash-proof or dust-resistant safety goggles to prevent eye contact with this substance.

Emergency eye wash: Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash

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fountain within the immediate work area for emergency use.

AUTHORIZED - FISHER SCIENTIFIC, INC.  
CREATION DATE: 10/25/84 REVISION DATE: 07/15/93

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FAX: (414) 273-4979

1/94

ATTN: SAFETY DIRECTOR  
MONSANTO AGRICULTURAL COMPANY  
ENVIRONMENTAL HEALTH LAB  
645 S NEWSTEAD AVE  
ST LOUIS MO 63110-1116

DATE: 01/19/94  
CUST#: 929118  
PO#: EHL0112192

M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 1

SECTION 1. - - - - - CHEMICAL IDENTIFICATION - - - - -

PRODUCT #: 37214-5      NAME: ~~TRICHLOROETHYLENE~~, ANHYDROUS, 99+2

SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - -

CAS #: 79-01-6  
MF: C2HCL3

SYNONYMS

ACETYLENE TRICHLORIDE \* ALGYLEN \* ANAMENTH \* BENZINOL \* BLACOSOLV \*  
BLANCOSOLV \* CECOLENE \* CHLORILEN \* 1-CHLORO-2,2-DICHLOROETHYLENE \*  
CHLORYLEN \* CIRCOSOLV \* CRAWHASPOL \* DENSINFLUAT \* 1,1-DICHLORO-2-  
CHLOROETHYLENE \* DOW-TRI \* DUKERON \* ETHINYL TRICHLORIDE \* ETHYLENE  
TRICHLORIDE \* FLECK-FLIP \* FLOCK FLIP \* FLUATE \* GERMALGENE \* LANADIN  
\* LETHURIN \* MARCOGEN \* NARKOSOID \* NCI-C04546 \* NIALK \* PERM-A-CHLOR  
\* PERM-A-CLOR \* PETZINOL \* PHILEX \* RCRA WASTE NUMBER U228 \*  
THRETHYLEN \* THRETHYLENE \* TRETHYLENE \* TRI \* TRIAD \* TRIAL \* TRIASOL  
\* TRICHLOROETHEN (DUTCH) \* TRICHLOROETHYLEEN, TRI (DUTCH) \*  
TRICHLORAETHEN (GERMAN) \* TRICHLORAETHYLEN, TRI (GERMAN) \* TRICHLORAN  
\* TRICHLOREN \* TRICHLORETHENE (FRENCH) \* TRICHLORETHYLENE \*  
TRICHLORETHYLENE, TRI (FRENCH) \* TRICHLOROETHENE \* TRICHLOROETHYLENE \*  
1,1,2-TRICHLOROETHYLENE \* 1,2,2-TRICHLOROETHYLENE \*  
TRICHLOROETHYLENE (ACGIH, DOT, OSHA) \* TRI-CLENE \* TRICLORETENE  
(ITALIAN) \* TRICLOROETILENE (ITALIAN) \* TRIELENE \* TRIELIN \* TRIELINA  
(ITALIAN) \* TRIELINE \* TRILEN \* TRILENE \* TRILINE \* TRIMAR \* TRIOL \*  
TRI-PLUS \* TRI-PLUS M \* UN1710 (DOT) \* VESTROL \* VITRAN \* WESTROSOL \*

SECTION 3. - - - - - HAZARDS IDENTIFICATION - - - - -

LABEL PRECAUTIONARY STATEMENTS

TOXIC  
MAY CAUSE CANCER.  
MAY CAUSE HERITABLE GENETIC DAMAGE.  
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.  
CAUSES SEVERE IRRITATION.  
TARGET ORGAN(S):  
CENTRAL NERVOUS SYSTEM  
LIVER, KIDNEYS  
HEART  
LUNGS  
IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW THE LABEL WHERE  
POSSIBLE).  
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF

CONTINUED ON NEXT PAGE

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

**PAGE 2**

**CUST#: 929118  
PO#: EHL0112192**

**PRODUCT #: 372145  
MF: C2HCL3**

**NAME: TRICHLOROETHYLENE, ANHYDROUS, 99+%**

**WATER AND SEEK MEDICAL ADVICE.  
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE  
PROTECTION.  
PROTECT FROM LIGHT.**

**SECTION 4. - - - - - FIRST-AID MEASURES - - - - -**

**IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS  
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED  
CLOTHING AND SHOES.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL  
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.  
CALL A PHYSICIAN IMMEDIATELY.  
DISCARD CONTAMINATED CLOTHING AND SHOES.**

**SECTION 5. - - - - - FIRE FIGHTING MEASURES - - - - -**

**EXTINGUISHING MEDIA  
NONCOMBUSTIBLE.  
USE EXTINGUISHING MEDIA APPROPRIATE TO SURROUNDING FIRE CONDITIONS.  
SPECIAL FIREFIGHTING PROCEDURES  
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO  
PREVENT CONTACT WITH SKIN AND EYES.  
UNUSUAL FIRE AND EXPLOSIONS HAZARDS  
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.**

**SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES - - - - -**

**EVACUATE AREA.  
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY  
RUBBER GLOVES.  
ABSORB ON SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR  
DISPOSAL.  
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.**

**SECTION 7. - - - - - HANDLING AND STORAGE - - - - -  
REFER TO SECTION 8.**

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

**PAGE 3**

**PRODUCT #:** 372145  
**MF:** C2HCL3

**NAME:** TRICHLOROETHYLENE, ANHYDROUS, 99+%

**CUST#:** 929118  
**PO#:** EHL0112192

**SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION - - - - -**

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.  
SAFETY SHOWER AND EYE BATH.  
USE ONLY IN A CHEMICAL FUME HOOD.  
DO NOT BREATHE VAPOR.  
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.  
AVOID PROLONGED OR REPEATED EXPOSURE.  
WASH THOROUGHLY AFTER HANDLING.  
SEVERE IRRITANT.  
HARMFUL VAPOR.  
CARCINOGEN.  
MUTAGEN.  
KEEP TIGHTLY CLOSED.  
PROTECT FROM LIGHT.  
STORE IN A COOL DRY PLACE.

**SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -**

**APPEARANCE AND ODOR**  
COLORLESS LIQUID  
BOILING POINT: 86.7 C  
MELTING POINT: -84.8 C  
FLASHPOINT NONE  
SPECIFIC GRAVITY: 1.463

**SECTION 10. - - - - - STABILITY AND REACTIVITY - - - - -**

**INCOMPATIBILITIES**  
OXIDIZING AGENTS  
REDUCING AGENTS  
STRONG BASES  
ALUMINUM  
MAGNESIUM  
SENSITIVE TO LIGHT

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

**PAGE 4**

**PRODUCT #:** 372145  
**MF:** C2HCL3

**NAME:** TRICHLOROETHYLENE, ANHYDROUS, 99+%

**CUST#:** 929118  
**PO#:** EHL0112192

**HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS**

**TOXIC FUMES OF:**  
CARBON MONOXIDE, CARBON DIOXIDE  
HYDROGEN CHLORIDE GAS  
PHOSGENE GAS

**SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -**

**ACUTE EFFECTS**

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.  
CAUSES SEVERE IRRITATION.  
HIGH CONCENTRATIONS ARE EXTREMELY DESTRUCTIVE TO TISSUES OF THE MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT, EYES AND SKIN.  
SYMPTOMS OF EXPOSURE MAY INCLUDE BURNING SENSATION, COUGHING, WHEEZING, LARYNGITIS, SHORTNESS OF BREATH, HEADACHE, NAUSEA AND VOMITING.  
EXPOSURE TO AND/OR CONSUMPTION OF ALCOHOL MAY INCREASE TOXIC EFFECTS.  
EXPOSURE CAN CAUSE:  
GASTROINTESTINAL DISTURBANCES  
DAMAGE TO THE KIDNEYS  
NAUSEA, DIZZINESS AND HEADACHE  
NARCOTIC EFFECT  
PROLONGED CONTACT CAN CAUSE:  
DERMATITIS

**CHRONIC EFFECTS**

CARCINOGEN.  
MAY ALTER GENETIC MATERIAL.  
TARGET ORGAN(S):  
CENTRAL NERVOUS SYSTEM  
LIVER, KIDNEYS  
HEART  
LUNGS

**RTECS NO:** KX4550000

**ETHYLENE, TRICHLORO-**  
**IRRITATION DATA**  
SKN-RBT 2 MG/24H SEV  
EYE-RBT 20 MG/24H MOD  
**TOXICITY DATA**  
ORL-HMN LOLO: 7 GM/KG

85JCAE -,106,86  
85JCAE -,106,86  
ARTODN 35,295,76

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

**PAGE 5**

**PRODUCT #:** 372145  
**MF:** C2HCL3

**NAME:** TRICHLOROETHYLENE, ANHYDROUS, 99+%

**CUST#:** 929118

**PO#:** EHL0112192

IHL-MAN LCLO:2900 PPM  
ORL-RAT LD50:5650 MG/KG  
IPR-RAT LD50:1282 MG/KG  
ORL-MUS LD50:2402 MG/KG  
IHL-MUS LC50:8450 PPM/4H  
SCU-MUS LD50:16 GM/KG  
IVN-MUS LD50:33900 UG/KG  
IPR-DUG LD50:1900 MG/KG  
SKN-RBT LD50:>20 GM/KG

NZMJAX 50,119,51  
ATDAEI 1,713,92  
ENVRAL 40,411,86  
NTIS\*\* AD-A080-636  
APTOA6 9,303,53  
JPETAB 123,224,58  
CBCCT\* 6,141,54  
TXAPA9 10,119,67  
NTIS\*\* AD-A062-138

**TARGET ORGAN DATA**

SENSE ORGANS AND SPECIAL SENSES (OTHER EYE EFFECTS)  
BEHAVIORAL (SOMNOLENCE)  
BEHAVIORAL (HALLUCINATIONS, DISTORTED PERCEPTIONS)  
VASCULAR (TUMORS)  
LUNGS, THORAX OR RESPIRATION (TUMORS)  
GASTROINTESTINAL (OTHER CHANGES)  
LIVER (JAUNDICE, OTHER OR UNCLASSIFIED)  
LIVER (LIVER FUNCTION TESTS IMPAIRED)  
LIVER (TUMORS)  
BLOOD (LYMPHOMA INCLUDING HODGKIN'S DISEASE)  
SKIN AND APPENDAGES (TUMORS)  
PATERMAL EFFECTS (SPERMATOGENESIS)  
EFFECTS ON FERTILITY (POST-IMPLANTATION MORTALITY)  
EFFECTS ON EMBRYO OR FETUS (FETOTOXICITY)  
SPECIFIC DEVELOPMENTAL ABNORMALITIES (CENTRAL NERVOUS SYSTEM)  
SPECIFIC DEVELOPMENTAL ABNORMALITIES (MUSCULOSKELETAL SYSTEM)  
SPECIFIC DEVELOPMENTAL ABNORMALITIES (UROGENITAL SYSTEM)  
SPECIFIC DEVELOPMENTAL ABNORMALITIES (OTHER DEVELOPMENTAL ABNORMALITIES)  
TUMORIGENIC (CARCINOGENIC BY RTECS CRITERIA)  
TUMORIGENIC (EQUIVOCAL TUMORIGENIC AGENT BY RTECS CRITERIA)  
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES  
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR  
COMPLETE INFORMATION.

**SECTION 12. - - - - - ECOLOGICAL INFORMATION - - - - -**  
DATA NOT YET AVAILABLE.

**SECTION 13. - - - - - DISPOSAL CONSIDERATIONS - - - - -**

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

**PAGE 6**

**PRODUCT #:** 372145  
**MF:** C2HCL3

**NAME:** TRICHLOROETHYLENE, ANHYDROUS, 99+2  
**CUST#:** 929118  
**PO#:** EHL0112192

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER. OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

**SECTION 14. - - - - - TRANSPORT INFORMATION - - - - -**

CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

**SECTION 15. - - - - - REGULATORY INFORMATION - - - - -**

**REVIEWS, STANDARDS, AND REGULATIONS**

ACGIH TLV-TWA 50 PPM; STEL 200 PPM	85 INAB 5,595,86
IARC CANCER REVIEW: ANIMAL LIMITED EVIDENCE	IMEMDT 20,545,79
IARC CANCER REVIEW: HUMAN INADEQUATE EVIDENCE	IMEMDT 20,545,79
IARC CANCER REVIEW: GROUP 3	INSUOL 7,364,87
MSHA STANDARD-AIR: TWA 100 PPM (535 MG/M3)	
DTLVS* 3,263,71	
OSHA PEL: 8H TWA 100 PPM; CL 200; PK 300/5M/2H	
FEREAC 54,2923,89	
OSHA PEL FINAL: 8H TWA 50 PPM (270 MG/M3); STEL 200 PPM (1080 MG/M3)	
FEREAC 54,2923,89	
OEL-AUSTRALIA: TWA 50 PPM (270 MG/M3); STEL 200 PPM (1080 MG/M3)	
JANUARY 1993	
OEL-BELGIUM: TWA 50 PPM (269 MG/M3); STEL 200 PPM (1070 MG/M3)	JANUARY
1993	
OEL-CZECHOSLOVAKIA: TWA 250 MG/M3; STEL 1250 MG/M3	JANUARY 1993
OEL-DENMARK: TWA 30 PPM (160 MG/M3)	JANUARY 1993
OEL-FINLAND: TWA 30 PPM (160 MG/M3); STEL 45 PPM (240 MG/M3); SKIN	
JANUARY 1993	
OEL-FRANCE: TWA 75 PPM (405 MG/M3); STEL 200 PPM (1080 MG/M3)	JANUARY
1993	
OEL-GERMANY: TWA 50 PPM (270 MG/M3); CARCINOGEN	JANUARY 1993
OEL-HUNGARY: TWA 10 MG/M3; STEL 40 MG/M3	JANUARY 1993
OEL-JAPAN: TWA 50 PPM (270 MG/M3)	JANUARY 1993
OEL-THE NETHERLANDS: TWA 35 PPM (190 MG/M3); STEL 100 PPM (530 MG/M3)	
JANUARY 1993	
OEL-THE PHILIPPINES: TWA 100 PPM (535 MG/M3)	JANUARY 1993
OEL-POLAND: TWA 50 MG/M3	JANUARY 1993
OEL-RUSSIA: TWA 50 PPM; STEL 10 MG/M3	JANUARY 1993
OEL-SWEDEN: TWA 10 PPM (50 MG/M3); STEL 25 PPM (140 MG/M3)	JANUARY 1993

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CUST#: 929118  
PO#: EHL0112192

PRODUCT #: 372145  
MF: C2HCL3

NAME: TRICHLOROETHYLENE, ANHYDROUS, 99+%

DEL-THAILAND: TWA 100 PPM; STEL 200 PPM JANUARY 1993  
DEL-TURKEY: TWA 100 PPM (535 MG/M3) JANUARY 1993  
OEL-UNITED KINGDOM: TWA 100 PPM (535 MG/M3); STEL 150 PPM (802 MG/M3); SKIN JANUARY 1993  
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA, NEW ZEALAND, SINGAPORE, VIETNAM CHECK ACCIN TLV  
NIOSH REL TO TRICHLOROETHYLENE-AIR: 10H CA TWA 25 PPM; CL 2 PPM/1H  
NIOSH\* DHHS #92-100,92  
NIOSH REL TO WASTE ANESTHETIC GASES AND VAPORS-AIR: CL 2 PPM/1H  
MMWR\*\* 37(S-7), 28,88  
NOS 1974: HZD 73790; NIS 251; TNF 37699; NOS 141; TNE 446588  
NOS 1983: HZD 73790; NIS 192; TNF 23225; NOS 143; TNE 401373; TFE 175316  
ATSDR TOXICOLOGY PROFILE (NTIS\*\* PB/90/127523/AS)  
EPA GENETOX PROGRAM 1988, POSITIVE: CELL TRANSFORM.-RLV F344 RAT EMBRYO; HOST-MEDIATED ASSAY  
EPA GENETOX PROGRAM 1988, POSITIVE: MOUSE SPOT TEST; SPERM MORPHOLOGY-MOUSE  
EPA GENETOX PROGRAM 1988, POSITIVE: S CEREVISIAE GENE CONVERSION; S CEREVISIAE-HOMOZYGOSIS  
EPA GENETOX PROGRAM 1988, POSITIVE: S CEREVISIAE-REVERSION  
EPA GENETOX PROGRAM 1988, POSITIVE/LIMITED: CARCINOGENICITY-MOUSE/RAT  
EPA GENETOX PROGRAM 1988, NEGATIVE: D MELANOGASTER SEX-LINKED LETHAL  
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: HISTIDINE REVERSION-AMES TEST  
EPA TSCA CHEMICAL INVENTORY, JANUARY 1993  
EPA TSCA SECTION 8(E) STATUS REPORT  
BEHQ-0680-0345; BEHQ-0982-0457; BEHQ-0979-0310  
EPA TSCA SECTION 8(E) STATUS REPORT BEHQ-0578-0146  
ON EPA IRIS DATABASE  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, SEPTEMBER 1993  
NIOSH CURRENT INTELLIGENCE BULLETIN 2, 1975  
NIOSH ANALYTICAL METHODS: SEE TRICHLOROETHYLENE, 1022;  
TRICHLOROETHYLENE BY PORTABLE GC, 3701  
NCI CARCINOGENESIS BIOASSAY (GAVAGE); CLEAR EVIDENCE: MOUSE  
NCITR\* NCI-TR-2,76  
NTP CARCINOGENESIS STUDIES (GAVAGE); CLEAR EVIDENCE: MOUSE  
NTPTR\* NTP-TR-243,83  
NCI CARCINOGENESIS BIOASSAY (GAVAGE); NO EVIDENCE: RAT  
NCITR\* NCI-TR-2,76  
NTP CARCINOGENESIS STUDIES (GAVAGE); INADEQUATE STUDY: RAT  
NTPTR\* NTP-TR-273,88

**CONTINUED ON NEXT PAGE**

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

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**CUST#: 929118**

**PO#: EHL0112192**

**PRODUCT #: 372145**  
**MF: C2HCL3**

**NAME: TRICHLOROETHYLENE, ANHYDROUS, 99+%**

**NCI CARCINOGENESIS STUDIES (GAVAGE): INADEQUATE STUDIES:RAT**

**NTPTR\* NTP-TR-243,83**

**THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.**

**SECTION 16. - - - - - OTHER INFORMATION - - - - -**

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103148 10/93

DATE: 12/01/93 ACCT: 267682-01  
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\*\*PHENOL\*\*  
\*\*PHENOL\*\*  
\*\*PHENOL\*\*

#### MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC  
CHEMICAL DIVISION  
1 REAGENT LANE  
FAIR LAWN NJ 07410  
(201) 798-7100

EMERGENCY NUMBER: (201) 798-7100  
CHEMTREC ASSISTANCE: (800) 424-9300

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#### SUBSTANCE IDENTIFICATION

CAS-NUMBER 108-95-2

SUBSTANCE: \*\*PHENOL\*\*

#### TRADE NAMES/SYNONYMS:

BENZENOL; CARBOLIC ACID; ENT 1814; HYDROXYBENZENE; MONOHYDROXYBENZENE;  
MONOPHENOL; OXYBENZENE; PHENIC ACID; PHENYL ALCOHOL; PHENYL HYDRATE;  
PHENYL HYDROXIDE; PHENYLIC ACID; PHENYLIC ALCOHOL; STCC 4921220; UN 1671;  
RCRA U188; BP228; A911; A931; A931; A88; A92; C6H6O; ACC18380

CHEMICAL FAMILY:  
Hydroxyl, aromatic

MOLECULAR FORMULA: C6-H5-O-H

MOLECULAR WEIGHT: 94.11

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=2 REACTIVITY=0 PERSISTENCE=1  
NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=2 REACTIVITY=0

#### COMPONENTS AND CONTAMINANTS

COMPONENT: PHENOL PERCENT: 100  
CAS# 108-95-2

OTHER CONTAMINANTS: NONE

#### EXPOSURE LIMITS:

PHENOL:  
5 ppm (19 mg/m3) OSHA TWA (skin)  
5 ppm (19 mg/m3) ACGIH TWA (skin)  
5 ppm (19 mg/m3) NIOSH recommended TWA  
15.6 ppm (60 mg/m3) NIOSH recommended ceiling  
5 ppm (19 mg/m3) DFG MAK TWA  
10 ppm (38 mg/m3) DFG MAK 5 minute peak, momentary value, 8 times/shift

Measurement method: XAD-7(R) tube; methanol; high-pressure liquid chromatography with ultraviolet detection; (OSHA # 32).

500/10,000 pounds SARA Section 302 Threshold Planning Quantity  
1000 pounds SARA Section 304 Reportable Quantity  
1000 pounds CERCLA Section 103 Reportable Quantity  
Subject to SARA Section 313 Annual Toxic Chemical Release Reporting

#### PHYSICAL DATA

DESCRIPTION: Colorless to pinkish, hygroscopic crystalline solid with a sharp, sweet, tarry odor and a sharp burning taste.

BOILING POINT: 359 F (182 C) MELTING POINT: 106 F (41 C)

SPECIFIC GRAVITY: 1.07 VAPOR PRESSURE 0.36 mmHg @ 20 C

EVAPORATION RATE: (butyl acetate=1) 0.01 PH: 6 (aq soln)

SOLUBILITY IN WATER: 8.4% ODOR THRESHOLD: 0.047 ppm VAPOR DENSITY: 3.2

SOLVENT SOLUBILITY: Soluble in ethanol, benzene, chloroform, ether, carbon disulfide, glycerol, acetone, petrolatum, volatile and fixed oils, aqueous alkali hydroxides, dimethyl sulfoxide; slightly soluble in petroleum ether

VISCOSITY: 1.51 cP @ 80 C

#### FIRE AND EXPLOSION DATA

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FIRE AND EXPLOSION HAZARD:  
Moderate fire hazard when exposed to heat or flame.

Vapor-air mixtures are explosive above flash point.

Vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back.

FLASH POINT: 174 F (79 C) (CC) UPPER EXPLOSIVE LIMIT: 8.6%

LOWER EXPLOSIVE LIMIT: 1.7% AUTOIGNITION TEMP: 1319 F (715 C)

FLAMMABILITY CLASS(OSHA): IIIA

#### FIREFIGHTING MEDIA:

Dry chemical, water spray or regular foam  
(1990 Emergency Response Guidebook, DOT P 5800.5).

For larger fires, use water spray, fog or regular foam  
(1990 Emergency Response Guidebook, DOT P 5800.5).

Alcohol foam  
(NFPA 325M, Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids, 1991).

#### FIREFIGHTING:

Move container from fire area if you can do it without risk. Fight fire from maximum distance. Stay away from ends of tanks. Dike fire-control water for later disposal; do not scatter the material (1990 Emergency Response Guidebook, DOT P 5800.5, Guide Page 55).

Extinguish using agents indicated. Use flooding quantities of water as a fog. Solid streams may be ineffective. Cool fire-exposed containers with flooding amounts of water. Apply water from as far a distance as possible. Dike water to prevent entry into sewers and waterways. Avoid breathing fumes; keep upwind.

#### TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49-CFR 172.101:  
Poison B

Department of Transportation labeling requirements 49-CFR 172.101 and SUBPART E:  
Poison

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49-CFR 173.369  
EXCEPTIONS: 49-CFR 173.364

Final rule on hazardous materials regulations (HMR, 49 CFR parts 171-180), docket numbers HM-181, HM-181a, HM-181b, HM-181c, HM-181d and HM-204 Effective date October 1, 1991. However, compliance with the regulations is authorized on and after January 1, 1991. (55 FR 52402, 12/21/90)

Except for explosives, inhalation hazards, and infectious substances, the effective date for hazard communication requirements is extended to October 1, 1993. (56 FR 47158, 09/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101  
Phenol, solid-UN 1671

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101  
6.1 - Poisonous materials

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101  
PG II

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101  
AND SUBPART E  
Poison

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS  
EXCEPTIONS: None  
NON-BULK PACKAGING: 49 CFR 173.212  
BULK PACKAGING: 49 CFR 173.240

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101  
PASSENGER AIRCRAFT OR RAILCAR: 25 kg  
CARGO AIRCRAFT ONLY: 100 kg

#### TOXICITY

#### PHENOL

IRRITATION DATA: 500 mg/24 hours skin-rabbit severe; 535 mg open skin-rabbit severe; 100 mg skin-rabbit mild; 5 mg eye-rabbit severe; 5 mg/30 seconds rinsed eye-rabbit mild.

TOXICITY DATA: 316 mg/m3 inhalation-rat LC50; 177 mg/m3 inhalation-mouse LC50; 74 mg/m3 inhalation-mammal LC50; 850 mg/kg skin-rabbit LD50; 689 mg/kg

skin-rat LD50: 14 gm/kg oral-human LDLo: 140 mg/kg oral-human LDLo:  
10 mg/kg oral-infant LDLo: 317 mg/kg oral-rat LD50: 270 mg/kg oral-mouse  
LD50: 420 mg/kg oral-rabbit LDLo: 80 mg/kg oral-cat LDLo: 500 mg/kg  
oral-dog LDLo: 80 mg/kg subcutaneous-cat LDLo: 450 mg/kg subcutaneous-guinea  
pig LDLo: 344 mg/kg subcutaneous-mouse LD50: 460 mg/kg subcutaneous-rat  
LD50: 620 mg/kg subcutaneous-rabbit LDLo: 112 mg/kg intravenous-mouse  
LD50: 180 mg/kg intravenous-rabbit LDLo: 300 mg/kg intraperitoneal-guinea  
pig LDLo: 180 mg/kg intraperitoneal-mouse LD50: 127 mg/kg  
intraperitoneal-rat LD50: mutagenic data (RTECS); reproductive effects  
data (RTECS); tumorigenic data (RTECS)  
CARCINOGEN STATUS: Human Inadequate Evidence, Animal Inadequate Evidence  
(IARC Group-3).  
LOCAL EFFECTS: Corrosive- inhalation, skin, eye, ingestion.  
ACUTE TOXICITY LEVEL: Highly toxic by inhalation; toxic by dermal absorption  
and ingestion.  
TARGET EFFECTS: Neurotoxin; central nervous system depressant. Poisoning may  
also affect the liver and kidneys.  
AT INCREASED RISK FROM EXPOSURE: Persons with convulsive disorders and  
abnormalities of the skin, respiratory tract, liver and kidneys.

#### HEALTH EFFECTS AND FIRST AID

##### INHALATION:

PHENOL:  
CORROSIVE/NEUROTOXIN/NARCOTIC/HIGHLY TOXIC.  
250 ppm Immediately Dangerous to Life or Health

ACUTE EXPOSURE- Inhalation may cause severe irritation of the mucous  
membranes, profuse sweating, headache, intense thirst, nausea and  
vomiting, abdominal pain, diarrhea, salivation, cyanosis, tinnitus,  
twitching, tremors, and convulsions. The central nervous system may  
initially be stimulated followed by severe, profound depression  
progressing to coma. The heart rate may increase then become  
slow and irregular. The blood pressure may increase slightly and  
then fall markedly with dyspnea and fall in body temperature.  
Stertorous breathing, mucous rales, and frothing at the mouth and nose may  
indicate the presence of pulmonary edema, which may be followed by  
pneumonia. Methemoglobinemia and hemolysis have been reported  
occasionally. Death may occur from respiratory, circulatory or cardiac  
failure. If death is not immediate, jaundice and oliguria or anuria may  
occur.

CHRONIC EXPOSURE- Symptoms of chronic phenol poisoning may include  
vomiting, difficulty swallowing, ptialism, diarrhea, anorexia, headache,  
vertigo, muscle weakness and pain, mental disturbances, dark or smoky  
urine and possibly skin eruptions. Extensive damage to the liver and  
kidneys may be fatal. Hind limb paralysis has been reported in animals.  
Pathologic findings in animals repeatedly exposed to phenol vapors  
include extensive necrosis of the myocardium, acute lobular pneumonia,  
vascular damage, and liver and kidney damage.

FIRST AID- Remove from exposure area to fresh air immediately. If breathing  
has stopped, give artificial respiration. Maintain airway and blood  
pressure and administer oxygen if available. Keep affected person warm and  
at rest. Treat symptomatically and supportively. Administration of oxygen  
should be performed by qualified personnel. Get medical attention  
immediately.

##### SKIN CONTACT:

PHENOL:  
CORROSIVE/NEUROTOXIN/NARCOTIC/TOXIC.

ACUTE EXPOSURE- Contact with 0.5% solutions may cause local anesthesia, 1%  
solutions sometimes cause skin necrosis, and 10% solutions may cause  
burns. Phenol burns may be severe, but painless due to damage to nerve  
endings. The skin may turn white, and later yellowish-brown and may be  
deeply eroded and scarred. Gangrene may occur at the site of contact.  
Vapors and liquid may be readily absorbed through the skin to cause  
systemic effects as detailed in acute inhalation exposure. There have  
been several reports of cardiac arrhythmias associated with application  
of solutions of phenol, hexachlorophene, and croton oil to the skin.  
Profound coma and death have been reported to occur within 10 minutes  
following skin contact pathologic findings included congestion of the  
lungs, liver, spleen, and kidneys.

CHRONIC EXPOSURE- Prolonged exposure may cause a blue or brownish  
discoloration of the tendons over the knuckles of the hands, dermatitis,  
vitiligo, and rarely, skin sensitization. Symptoms of chronic phenol  
poisoning may occur as detailed as in chronic inhalation exposure.  
Evaluated by RTECS as producing carcinogenic and neoplastic tumors in  
mice.

FIRST AID- Remove contaminated clothing and shoes immediately. Wash affected  
area with soap or mild detergent and large amounts of water until no  
evidence of chemical remains (at least 15-20 minutes). In case of chemical  
burns, cover area with sterile, dry dressing. Bandage securely, but not  
too tightly. Get medical attention immediately.

##### EYE CONTACT:

PHENOL:

CORROSIVE.

ACUTE EXPOSURE- Vapors have caused marked irritation from brief,  
intermittent industrial exposure to 48 ppm. Concentrated liquid or

solid may cause severe irritation with redness, pain, and blurred vision.  
Concentrated phenol in human eyes has caused chemotic conjunctiva,  
hyposthetic, white cornea, edematous eyelids, and severe iritis. In  
some cases, the eyelids have been so severely damaged that they required  
plastic surgery. The final visual results have varied from complete  
recovery, to partial recovery, to blindness and loss of the eye.  
Crystalline or concentrated aqueous phenol on rabbits eyes causes almost  
instantaneous white opacification of the corneal epithelium. Eight hours  
later, the cornea was anesthetic, the surface ulcerated, and the stroma  
opaque. Five weeks later, entropion, scarring of the conjunctiva and  
opacity of the cornea occurred.  
CHRONIC EXPOSURE- Repeated or prolonged exposure to phenol vapors may cause  
conjunctivitis and has caused gray discoloration of the sclera with brown  
spots near the insertion of the rectus muscle tendon.

FIRST AID- Wash eyes immediately with large amounts of water, occasionally  
lifting upper and lower lids, until no evidence of chemical remains (at  
least 15-20 minutes). Continue irrigating with normal saline until the pH  
has returned to normal (30-60 minutes). Cover with sterile bandages. Get  
medical attention immediately.

##### INGESTION:

PHENOL:

CORROSIVE/NEUROTOXIN/NARCOTIC/TOXIC.

ACUTE EXPOSURE- Ingestion may cause immediate intense burning of the mouth  
and throat, white or brownish stains and areas of necrosis on the lips  
and in the mouth and esophagus, marked abdominal pain, pale face,  
and contracted or dilated pupils. Systemic effects may occur as  
detailed in acute inhalation exposure. The approximate lethal dose in  
man is 140 mg/kg.

CHRONIC EXPOSURE- Persons ingesting phenol contaminated well water  
experienced diarrhea, dark urine, and sores and burning in the mouth.  
Other symptoms of chronic phenol poisoning may occur as detailed in  
chronic inhalation exposure. Administration of phenol in drinking water  
to rats for three generations produced stunted growth at 7000 ppm over 2  
generations; offspring of rats given 10,000 ppm died; at 12,000 ppm  
animals did not reproduce. Other reproductive effects have also been  
reported in animals.

FIRST AID- If victim is conscious, and if corrosive injury is absent,  
remove poison by gastric lavage or emesis. Activated charcoal is useful.  
Follow with 240 ml of milk. Gastric lavage and emesis are not to be used  
in the presence of esophageal injury (Dreisbach, Handbook of Poisoning, 12th  
Ed.). Gastric lavage should be performed by qualified medical personnel.  
Get medical attention immediately.

##### ANTIDOTE:

No specific antidote. Treat symptomatically and supportively.

#### REACTIVITY

##### REACTIVITY:

Stable under normal temperatures and pressures.

##### INCOMPATIBILITIES:

PHENOL:

ACETALDEHYDE: Violent reaction.  
ALUMINUM AND ALLOYS: May corrode.  
ALUMINUM CHLORIDE + NITROBENZENE: Violent explosion.  
1,3-BUTADIENE, BORON TRIFLUORIDE, AND DIETHYLETHERTATE: Possible explosion.  
CALCIUM HYPOCHLORITE: Exothermic reaction with possible ignition.  
FORMALDEHYDE: Possible exothermic reaction.  
LEAD AND ALLOYS: May corrode.  
MAGNESIUM AND ALLOYS: May corrode.  
METALS AND ALLOYS: May corrode.  
OXIDIZERS (STRONG): Fire and explosion hazard.  
PEROXODISULFURIC ACID: Possible explosion.  
PEROXOMONOSULFURIC ACID: Explosion.  
PLASTICS, RUBBER, COATINGS: May corrode.  
SODIUM NITRATE + TRIFLUOROACETIC ACID: Violent exothermic reaction.  
SODIUM NITRITE: May explode.  
ZINC AND ALLOYS: May corrode.

##### DECOMPOSITION:

Thermal decomposition products may include toxic oxides of carbon.

##### POLYMERIZATION:

Hazardous polymerization has not been reported to occur under normal  
temperatures and pressures.

#### STORAGE AND DISPOSAL

Observe all federal, state and local regulations when storing or disposing  
of this substance.

\*\*Storage\*\*

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Store in a cool, dry, well-ventilated location. Separate from oxidizers and acute fire hazards. (NFPA 49, Hazardous Chemicals Data, 1991).

Store away from incompatible substances.

**Threshold Planning Quantity (TPQ):**  
The Superfund Amendments and Reauthorization Act (SARA) Section 302 requires that each facility where any extremely hazardous substance is present in a quantity equal to or greater than the TPQ established for that substance notify the state emergency response commission for the state in which it is located. Section 303 of SARA requires these facilities to participate in local emergency response planning (40 CFR 355.30).

\*\*\*\*\*  
CONDITIONS TO AVOID

May burn but does not ignite readily. Containers may explode in heat of fire.

\*\*\*\*\*  
SPILL AND LEAK PROCEDURES

**SOIL SPILL:**

Dig a holding area such as pit, pond or lagoon to contain spilled material. Use protective cover such as a plastic sheet to prevent dissolving in firefighting water or rain.

Neutralize spill with slaked lime, sodium bicarbonate or crushed limestone.

**AIR SPILL:**

Apply water spray to knock down and reduce vapors. Knock-down water is corrosive and toxic and should be diked for containment.

**WATER SPILL:**

Use activated carbon to absorb spilled substance that is dissolved.

Use mechanical dredges or lifts to extract immobilized masses of pollution and precipitates.

**OCCUPATIONAL SPILL:**

Do not touch spilled material. Stop leak if you can do it without risk. Use water spray to reduce vapors. For small spills, take up with sand or other absorbent material and place into containers for later disposal. For small dry spills, with a clean shovel place material into clean, dry containers and cover. Move containers from spill area. For larger spills, dike far ahead of spill for later disposal. Keep unnecessary people away. Isolate hazard area and deny entry. Ventilate closed spaces before entering.

**Reportable Quantity (RQ):** 1000 pounds  
The Superfund Amendments and Reauthorization Act (SARA) Section 304 requires that a release equal to or greater than the reportable quantity for this substance be immediately reported to the local emergency planning committee and the state emergency response commission (40 CFR 355.40). If the release of this substance is reportable under CERCLA Section 103, the National Response Center must be notified immediately at (800) 424-8802 or (202) 426-2875 in the metropolitan Washington, D.C. area (40 CFR 302.6).

-----  
PROTECTIVE EQUIPMENT

**VENTILATION:**

Process enclosure ventilation recommended to meet published exposure limits. Ventilation equipment must be explosion-proof.

**RESPIRATOR:**

The following respirators and maximum use concentrations are recommendations by the U.S. Department of Health and Human Services, NIOSH pocket guide to chemical hazards; NIOSH criteria documents or by the U.S. Department of Labor, 29 CFR 1910 Subpart Z.  
The specific respirator selected must be based on contamination levels found in the work place, must not exceed the working limits of the respirator and be jointly approved by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH-MSHA).

**PHENOL:**

50 ppm- Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust and mist filter.  
Any supplied-air respirator.  
Any self-contained breathing apparatus.

125 ppm- Any supplied-air respirator operated in a continuous flow mode  
any powered air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter.

250 ppm- Any self-contained breathing apparatus with a full facepiece.  
Any supplied-air respirator with a full facepiece.  
Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency

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particulate filter.

Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted organic vapor canister having a high-efficiency particulate filter.

Any powered air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter.

Escape- Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted organic vapor canister having a high-efficiency particulate filter.  
Any appropriate escape-type self-contained breathing apparatus.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

**CLOTHING:**

Employee must wear appropriate protective (impervious) clothing and equipment to prevent any possibility of skin contact with this substance.

**GLOVES:**

Employee must wear appropriate protective gloves to prevent contact with this substance.

**EYE PROTECTION:**

Employee must wear splash-proof or dust-resistant safety goggles and a faceshield to prevent contact with this substance.

**Emergency wash facilities:**

Where there is any possibility that an employee's eyes and/or skin may be exposed to this substance, the employer should provide an eye wash fountain and quick drench shower within the immediate work area for emergency use.

AUTHORIZED - FISHER SCIENTIFIC, INC.  
CREATION DATE: 09/25/84 REVISION DATE: 10/18/93

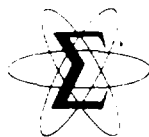
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DATE: 01/24/89

CUST#: 6-049-57830 PO#: R139239

## M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 1

### IDENTIFICATION

PRODUCT #: T1266  
CAS #: 88-06-2  
MF: C6H3CL3O

NAME: 2,4,6-TRICHLOROPHENOL

### SYNONYMS

DOWICIDE 2S \* DOWICIDE 2S \* NCI-C02904 \* OMAL \* PHENACHLOR \* RCRA  
WASTE NUMBER U231 \* 2,4,6-TRICHLORFENOL (CZECH) \* 2,4,6-  
TRICHLOROPHENOL \*

### TOXICITY HAZARDS

RTECS NO: SN1575000

PHENOL, 2,4,6-TRICHLORO-  
IRRITATION DATA

SKN-RBT 20 MG/24H MOD  
EYE-RBT 250 UG/24H SEV

85JCAE -,525,86  
85JCAE -,525,86

TOXICITY DATA

ORL-RAT LD50:820 MG/KG  
IPR-RAT LD50:276 MG/KG  
ORL-MAM LD50:454 MG/KG  
SKN-MAM LD50:700 MG/KG

PCOC\*\* -,1176,66  
BJPCAL 13,20,58  
GISAAA 45(10),16,80  
GISAAA 45(10),16,80

### REVIEWS, STANDARDS, AND REGULATIONS

IARC CANCER REVIEW:HUMAN LIMITED EVIDENCE IMEMDT 41,319,86  
IARC CANCER REVIEW:ANIMAL INADEQUATE EVIDENCE IMEMDT 20,349,79  
EPA GENETOX PROGRAM 1988, POSITIVE: CARCINOGENICITY-MOUSE/RAT; S  
CEREVISIAE-FORWARD MUTATION  
EPA GENETOX PROGRAM 1988, NEGATIVE: MOUSE SPOT TEST; HISTIDINE  
REVERSION-AMES TEST  
EPA GENETOX PROGRAM 1988, NEGATIVE: S CEREVISIAE GENE CONVERSION; S  
CEREVISIAE-HOMOZYGOSIS  
EPA TSCA CHEMICAL INVENTORY, 1986  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JUNE 1988  
NCI CARCINOGENESIS BIOASSAY (FEED);CLEAR EVIDENCE:MOUSE,RAT NCITR\*  
NCI-TR-155,79  
NTP FOURTH ANNUAL REPORT ON CARCINOGENS, 1984  
MEETS CRITERIA FOR PROPOSED OSHA MEDICAL RECORDS RULE FEREAC 47,30420,  
82

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS)  
DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

### HEALTH HAZARD DATA

### ACUTE EFFECTS

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.  
CAUSES EYE AND SKIN IRRITATION.  
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER  
RESPIRATORY TRACT.  
DEPENDING ON THE INTENSITY AND DURATION OF EXPOSURE, EFFECTS MAY  
VARY FROM MILD IRRITATION TO SEVERE DESTRUCTION OF TISSUE.

CONTINUED ON NEXT PAGE



**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

**PAGE 2**

CUST#: 6-049-57830 PO#: R139239

PRODUCT #: T1265

NAME : 2,4,6-TRICHLOROPHENOL

**----- HEALTH HAZARD DATA -----**

PROLONGED CONTACT CAN CAUSE:  
DAMAGE TO THE EYES  
CHRONIC EFFECTS  
CARCINOGEN.  
FIRST AID

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.  
ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS WITH FINGERS.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
CALL A PHYSICIAN.  
WASH CONTAMINATED CLOTHING BEFORE REUSE.

**----- PHYSICAL DATA -----**

BOILING PT: 246 C  
MELTING PT: 64 C TO 66 C  
VAPOR PRESSURE: 1 MM @ 76.5 C

**----- FIRE AND EXPLOSION HAZARD DATA -----**

FLASHPOINT: NONE  
EXTINGUISHING MEDIA  
CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.  
SPECIAL FIREFIGHTING PROCEDURES  
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.  
UNUSUAL FIRE AND EXPLOSIONS HAZARDS  
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

**----- REACTIVITY DATA -----**

INCOMPATIBILITIES  
ACID CHLORIDES  
ACID ANHYDRIDES  
OXIDIZING AGENTS  
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS  
TOXIC FUMES OF:  
CARBON MONOXIDE AND CARBON DIOXIDE  
HYDROGEN CHLORIDE GAS

**----- SPILL OR LEAK PROCEDURES -----**

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED  
EVACUATE AREA.  
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.  
WEAR DISPOSABLE COVERALLS AND DISCARD THEM AFTER USE.

CONTINUED ON NEXT PAGE

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

**PAGE 3**

**CUST#: 6-049-57830 PO#: R139239**

**PRODUCT #: T1266**

**NAME : 2,4,6-TRICHLOROPHENOL**

**----- SPILL OR LEAK PROCEDURES -----**

COVER WITH DRY LIME OR SODA ASH, PICK UP, KEEP IN A CLOSED CONTAINER  
AND HOLD FOR WASTE DISPOSAL.

**WASTE DISPOSAL METHOD**  
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A  
CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.  
OBSERVE ALL FEDERAL, STATE, AND LOCAL LAWS.

**--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---**

WEAR APPROPRIATE NIOSH-MSHA-APPROVED RESPIRATOR, CHEMICAL  
RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.

SAFETY SHOWER AND EYE BATH.  
USE ONLY IN A CHEMICAL FUME HOOD.

DO NOT BREATHE DUST.  
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

AVOID PROLONGED OR REPEATED EXPOSURE.

WASH THOROUGHLY AFTER HANDLING.

TOXIC.

IRRITANT.

CARCINOGEN.

KEEP TIGHTLY CLOSED.

STORE IN A COOL DRY PLACE.

**REGULATORY INFORMATION**

THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

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ST LOUIS MO 63167

DATE: 05/16/91  
CUST#: 325902  
PO#: R261347

M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 1

IDENTIFICATION

PRODUCT #: P1140-9  
CAS #: 85-01-8  
MF: C14H10

NAME: PHENANTHRENE, 98%

SYNONYMS

COAL TAR PITCH VOLATILES: PHENANTHRENE \* PHENANTHREN (GERMAN) \*  
PHENANTRIN \*

TOXICITY HAZARDS

RTECS NO: SF7175000

PHENANTHRENE

TOXICITY DATA

ORL-MUS LD50: 700 MG/KG

HYSAAV 29(6), 19,64

IPR-MUS LD50: 700 MG/KG

JJIND8 62,911,79

IVN-MUS LD50: 56 MG/KG

CSLNX\* NX#00190

REVIEWS, STANDARDS, AND REGULATIONS

IARC CANCER REVIEW: ANIMAL INADEQUATE EVIDENCE IMEMDT 32,419,83

IARC CANCER REVIEW: HUMAN NO ADEQUATE DATA IMEMDT 32,419,83

IARC CANCER REVIEW: GROUP 3 IMSUDL 7,56,87

OSHA PEL: 8H TWA 0.2 MG/M3 FEREAC 54,2923,89

OSHA PEL FINAL: 8H TWA 0.2 MG/M3 FEREAC 54,2923,89

NOES 1983: HZD M4032000; TNF 2; NIS 134; NOS 2; TNE 2242

EPA GENETOX PROGRAM 1988, POSITIVE: CELL TRANSFORM.-MOUSE EMBRYO

EPA GENETOX PROGRAM 1988, NEGATIVE: CELL TRANSFORM.-BALB/C-3T3; SHE-  
CLONAL ASSAY

EPA GENETOX PROGRAM 1988, NEGATIVE: CELL TRANSFORM.-MOUSE PROSTATE

EPA GENETOX PROGRAM 1988, NEGATIVE: IN VITRO CYTOGENETICS-NONHUMAN;

HST-MEDIATED ASSAY

EPA GENETOX PROGRAM 1988, NEGATIVE: E COLI POLA WITH S9; HISTIDINE

REVERSION-AMES TEST

EPA GENETOX PROGRAM 1988, NEGATIVE: IN VITRO SCE-NONHUMAN; IN VITRO

UDS-HUMAN FIBROBLAST

EPA GENETOX PROGRAM 1988, NEGATIVE: S CEREVISIAE-HOMOZYGOSIS

EPA GENETOX PROGRAM 1988, INCONCLUSIVE: CARCINOGENICITY-MOUSE/RAT

EPA GENETOX PROGRAM 1988, INCONCLUSIVE: CELL TRANSFORM.-RLV F344 RAT  
EMBRYO

EPA GENETOX PROGRAM 1988, INCONCLUSIVE: MAMMALIAN MICRONUCLEUS; E  
COLI POLA WITHOUT S9

EPA GENETOX PROGRAM 1988, INCONCLUSIVE: IN VIVO SCE-NONHUMAN

EPA TSCA CHEMICAL INVENTORY, JUNE 1990

EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, DECEMBER 1990

OSHA ANALYTICAL METHOD #ID-58

TARGET ORGAN DATA

SKIN AND APPENDAGES (TUMORS)

CONTINUED ON NEXT PAGE

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

**PAGE 2**

CUST#: 325902  
PO#: R261347

PRODUCT #: P1140-9  
CAS #: 85-01-8  
MF: C14H10

NAME: PHENANTHRENE, 98%

**----- TOXICITY HAZARDS -----**

TUMORIGENIC (NEOPLASTIC BY RTECS CRITERIA)  
TUMORIGENIC (TUMORS AT SITE OF APPLICATION)

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS)  
DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

**----- HEALTH HAZARD DATA -----**

**ACUTE EFFECTS**

HARMFUL IF SWALLOWED.  
MAY BE HARMFUL IF INHALED.  
MAY BE HARMFUL IF ABSORBED THROUGH THE SKIN.  
CAUSES EYE AND SKIN IRRITATION.  
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER  
RESPIRATORY TRACT.  
CAUSES PHOTOSENSITIVITY. EXPOSURE TO LIGHT CAN RESULT IN ALLERGIC  
REACTIONS RESULTING IN DERMATOLOGIC LESIONS, WHICH CAN VARY FROM  
SUNBURN LIKE RESPONSES TO EDEMATOUS, VESICULATED LESIONS OR BULLAE.

**CHRONIC EFFECTS**

LABORATORY EXPERIMENTS HAVE SHOWN MUTAGENIC EFFECTS.

**FIRST AID**

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF  
WATER FOR AT LEAST 15 MINUTES.  
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS  
AMOUNTS OF WATER.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL  
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.  
CALL A PHYSICIAN.  
DISCARD CONTAMINATED CLOTHING AND SHOES.

**ADDITIONAL INFORMATION**

CAN CAUSE SKIN PHOTOSENSITIZATION.

**----- PHYSICAL DATA -----**

BOILING PT: 336 C  
MELTING PT: 99 C TO 101 C  
SPECIFIC GRAVITY: 1.063

APPEARANCE AND ODOR  
WHITE CRYSTALS

**----- FIRE AND EXPLOSION HAZARD DATA -----**

EXTINGUISHING MEDIA  
WATER SPRAY.

CONTINUED ON NEXT PAGE

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

**PAGE 3**

**CUST#: 325902**  
**PO#: R261347**

**PRODUCT #: P1140-9**  
**CAS #: 85-01-8**  
**MF: C14H10**

**NAME: PHENANTHRENE, 98%**

**----- FIRE AND EXPLOSION HAZARD DATA -----**

**CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.**  
**SPECIAL FIREFIGHTING PROCEDURES**  
**WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO**  
**PREVENT CONTACT WITH SKIN AND EYES.**  
**UNUSUAL FIRE AND EXPLOSIONS HAZARDS**  
**EMITS TOXIC FUMES UNDER FIRE CONDITIONS.**

**----- REACTIVITY DATA -----**

**INCOMPATIBILITIES**  
**STRONG OXIDIZING AGENTS**  
**HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS**  
**TOXIC FUMES OF:**  
**CARBON MONOXIDE, CARBON DIOXIDE**

**----- SPILL OR LEAK PROCEDURES -----**

**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED**  
**WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY**  
**RUBBER GLOVES.**  
**SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.**  
**AVOID RAISING DUST.**  
**VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.**  
**WASTE DISPOSAL METHOD**  
**DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A**  
**CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.**  
**OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.**

**--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---**

**CHEMICAL SAFETY GOGGLES.**  
**RUBBER GLOVES.**  
**NIOSH/MSHA-APPROVED RESPIRATOR.**  
**SAFETY SHOWER AND EYE BATH.**  
**MECHANICAL EXHAUST REQUIRED.**  
**AVOID INHALATION.**  
**DO NOT GET IN EYES, ON SKIN, ON CLOTHING.**  
**AVOID PROLONGED OR REPEATED EXPOSURE.**  
**WASH THOROUGHLY AFTER HANDLING.**  
**HARMFUL SOLID.**  
**IRRITANT.**

**CONTINUED ON NEXT PAGE**

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

**PAGE 4**

**CUST#: 325902**  
**PQ#: R261347**

**PRODUCT #: P1140-9**  
**CAS #: 85-01-8**  
**MF: C14H10**

**NAME: PHENANTHRENE, 98%**

**--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---**

**PHOTOSENSITIZER.**  
**POSSIBLE MUTAGEN.**  
**KEEP TIGHTLY CLOSED.**  
**STORE IN A COOL DRY PLACE.**

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Telex: 714838 Aldri D  
FAX: 0732987139/239

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800 N LINDBERGH BLVD  
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EMERGENCY PHONE 1-314-771-5765

DATE: 10/14/93  
CUST#: 6-049-57831  
PO#: CV16  
07-810-760.14-2  
25-1000

## M A T E R I A L   S A F E T Y   D A T A   S H E E T PAGE 1

### SECTION 1. - - - - - CHEMICAL IDENTIFICATION - - - - -

PRODUCT #: D8793      NAME: 1,2-DICHLOROETHANE ACS REAGENT

### SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - -

CAS #: 107-06-2

MF: C2H4CL2

#### SYNONYMS

AETHYLENCHLORID (GERMAN) \* 1,2-DICHLOROETHANE \* BICHLORURE D'ETHYLENE (FRENCH) \* BORER SOL \* BROCID \* CHLORURE D'ETHYLENE (FRENCH) \* CLORURO DI ETHERE (ITALIAN) \* 1,2-DCE \* DESTRUOL BORER-SOL \* 1,2-DICHLOROETHAAN (DUTCH) \* 1,2-DICHLOR-ETHAN (GERMAN) \* DICHLOROMULSION \* 1,2-DICHLOROETHANE \* DI-CHLOR-MULSION \* DICHLORO-1,2-ETHANE (FRENCH) \* ALPHA, BETA-DICHLOROETHANE \* SYM-DICHLOROETHANE \* 1,2-DICHLOROETHANE \* DICHLOROETHYLENE \* 1,2-DICLOROTANO (ITALIAN) \* DUTCH LIQUID \* DUTCH OIL \* EDC \* ISENT 1,656 \* ETHANE DICHLORIDE \* ETHYLEN DICHLORIDE (DUTCH) \* ETHYLENE CHLORIDE \* ETHYLENE DICHLORIDE \* ETHYLENE DICHLORIDE (ACGIH, DOT, OSHA) \* 1,2-ETHYLENE DICHLORIDE \* GLYCOL DICHLORIDE \* NCI-C00511 \* RCRA WASTE NUMBER U077 \* UN1184 (DOT)

### SECTION 3. - - - - - HAZARDS IDENTIFICATION - - - - -

#### LABEL PRECAUTIONARY STATEMENTS

FLAMMABLE (USA DEFINITION)

HIGHLY FLAMMABLE (EUROPEAN DEFINITION)

TOXIC

MAY CAUSE CANCER.

MAY CAUSE HERITABLE GENETIC DAMAGE.

TOXIC BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.

IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.

TARGET ORGAN(S):

LIVER

KIDNEYS

KEEP AWAY FROM SOURCES OF IGNITION. NO SMOKING.

IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE.

WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE PROTECTION.

DO NOT BREATHE VAPOR.

CONTINUED ON NEXT PAGE

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- - - - -

CUST#: 6-049-57831  
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07-810-760.14-2  
25-1000

PRODUCT #: D8793  
MF: C2H4CL2

NAME: 1,2-DICHLOROETHANE ACS REAGENT

SECTION 4. - - - - - FIRST-AID MEASURES - - - - -

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.  
ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS WITH FINGERS.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.  
WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION 5. - - - - - FIRE FIGHTING MEASURES - - - - -

EXTINGUISHING MEDIA  
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.  
WATER MAY BE EFFECTIVE FOR COOLING, BUT MAY NOT EFFECT EXTINGUISHMENT.  
SPECIAL FIREFIGHTING PROCEDURES  
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.  
UNUSUAL FIRE AND EXPLOSIONS HAZARDS  
FLAMMABLE LIQUID.  
VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION AND FLASH BACK.  
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES - - - - -

EVACUATE AREA.  
SHUT OFF ALL SOURCES OF IGNITION.  
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.  
ABSORB ON SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR DISPOSAL.  
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - HANDLING AND STORAGE - - - - -

CONTINUED ON NEXT PAGE

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CUST#: 6-049-57831  
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07-810-760.14-2  
25-1000

PRODUCT #: D8793  
MF: C2H4CL2

NAME: 1,2-DICHLOROETHANE ACS REAGENT

REFER TO SECTION 8.

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION- - - - -

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.  
USE ONLY IN A CHEMICAL FUME HOOD.  
SAFETY SHOWER AND EYE BATH.  
DO NOT BREATHE VAPOR.  
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.  
AVOID PROLONGED OR REPEATED EXPOSURE.  
WASH THOROUGHLY AFTER HANDLING.  
IRRITANT.  
CARCINOGEN.  
MUTAGEN.  
HARMFUL LIQUID.  
TOXIC.  
KEEP TIGHTLY CLOSED.  
KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.  
STORE UNDER NITROGEN.

SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -

APPEARANCE AND ODOR  
CLEAR, COLORLESS LIQUID  
BOILING POINT: 83 C  
MELTING POINT: -35 C  
FLASHPOINT 60 F BY:  
AUTOIGNITION TEMPERATURE: 775 F  
UPPER EXPLOSION LEVEL: 15.6%  
LOWER EXPLOSION LEVEL: 6.2%  
VAPOR PRESSURE: 87MM 25 C  
VAPOR DENSITY: 3.4  
SPECIFIC GRAVITY: 1.256

SECTION 10. - - - - - STABILITY AND REACTIVITY- - - - -

CONTINUED ON NEXT PAGE

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CUST#: 6-049-57831  
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25-1000

PRODUCT #: D8793  
MF: C2H4CL2

NAME: 1,2-DICHLOROETHANE ACS REAGENT

INCOMPATIBILITIES  
OXIDIZING AGENTS  
ALUMINUM  
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS  
TOXIC FUMES OF:  
CARBON MONOXIDE, CARBON DIOXIDE  
HYDROGEN CHLORIDE GAS  
PHOSGENE GAS

### SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -

ACUTE EFFECTS  
HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.  
VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER  
RESPIRATORY TRACT.  
CAUSES SKIN IRRITATION.  
CAN CAUSE CNS DEPRESSION.  
CAUSES DERMATITIS.  
PROLONGED EXPOSURE CAN CAUSE:  
NAUSEA, HEADACHE AND VOMITING  
DAMAGE TO THE LIVER  
GASTROINTESTINAL DISTURBANCES  
DAMAGE TO THE KIDNEYS  
CHRONIC EFFECTS  
CARCINOGEN.  
MAY ALTER GENETIC MATERIAL.  
TARGET ORGAN(S):  
LIVER, KIDNEYS  
RTECS NO: KI0525000  
ETHANE, 1,2-DICHLORO-  
IRRITATION DATA  
SKN-RBT 625 MG OPEN MLD  
SKN-RBT 500 MG/24H MLD  
EYE-RBT 63 MG SEV  
EYE-RBT 500 MG/24H MLD  
TOXICITY DATA  
ORL-HMN LDLO:286 MG/KG  
ORL-MAN LDLO:714 MG/KG  
ORL-RAT LD50:670 MG/KG  
IHL-RAT LC50:1000 PPM/7H  
UCDS\*\* 3/23/70  
85JCAE -,93,86  
UCDS\*\* 3/23/70  
85JCAE -,93,86  
CLCEAL 86,203,47  
KLWOAZ 48,822,70  
FMCHA2 -,C130,91  
AMTHBC 4,482,51

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CUST#: 6-049-57831  
PO#: CV16  
07-810-760.14-2  
25-1000

PRODUCT #: D8793  
MF: C2H4CL2

NAME: 1,2-DICHLOROETHANE ACS REAGENT

IPR-RAT LD50:807 MG/KG  
SCU-RAT LD50:1 GM/KG  
ORL-MUS LD50:413 MG/KG  
IPR-MUS LD50:470 MG/KG  
ORL-DUG LD50:5700 MG/KG  
IHL-MKY LC50:3000 PPM/7H  
ORL-RBT LD50:860 MG/KG  
SKN-RBT LD50:2800 MG/KG

GTPZAB 26(4),26,82  
FAQNAU 48A,91,70  
EVHPAZ 43,41,82  
ARZNAU 11,902,61  
FAQNAU 48A,91,70  
85JCAE -,93,86  
GUHAZ 6,264,73  
FAQNAU 48A,91,70

### TARGET ORGAN DATA

SENSE ORGANS AND SPECIAL SENSES (LACRIMATION)  
BEHAVIORAL (GENERAL ANESTHETIC)  
BEHAVIORAL (SOMNOLENCE)  
BEHAVIORAL (ATAXIA)  
BEHAVIORAL (COMA)  
CARDIAC (CHANGE IN RATE)  
LUNGS, THORAX OR RESPIRATION (COUGH)  
LUNGS, THORAX OR RESPIRATION (CYANOSIS)  
LUNGS, THORAX OR RESPIRATION (OTHER CHANGES)  
LUNGS, THORAX OR RESPIRATION (TUMORS)  
GASTROINTESTINAL (ULCERATION OR BLEEDING FROM STOMACH)  
GASTROINTESTINAL (HYPERMOTILITY, DIARRHEA)  
GASTROINTESTINAL (NAUSEA OR VOMITING)  
LIVER (FATTY LIVER DEGENERATION)  
LIVER (JAUNDICE, OTHER OR UNCLASSIFIED)  
LIVER (OTHER CHANGES)  
KIDNEY, URETER, BLADDER (CHANGES IN TUBULES)  
BLOOD (LEUKEMIA)  
SKIN AND APPENDAGES (TUMORS)  
EFFECTS ON FERTILITY (POST-IMPLANTATION MORTALITY)  
NUTRITIONAL AND GROSS METABOLIC (BODY TEMPERATURE DECREASE)  
TUMORIGENIC (EQUIVOCAL TUMORIGENIC AGENT BY RTECS CRITERIA)  
BIOCHEMICAL EFFECTS (OTHER TRANSFERASES)  
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES  
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR  
COMPLETE INFORMATION.

SECTION 12. - - - - - ECOLOGICAL INFORMATION - - - - -  
DATA NOT YET AVAILABLE.

CONTINUED ON NEXT PAGE

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CUST#: 6-049-57831  
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25-1000

PRODUCT #: D8793  
MF: C2H4CL2

NAME: 1,2-DICHLOROETHANE ACS REAGENT

### SECTION 13. - - - - - DISPOSAL CONSIDERATIONS - - - - -

BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER BUT EXERT EXTRA CARE IN IGNITING AS THIS MATERIAL IS HIGHLY FLAMMABLE.  
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

### SECTION 14. - - - - - TRANSPORT INFORMATION - - - - -

CONTACT SIGMA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

### SECTION 15. - - - - - REGULATORY INFORMATION - - - - -

#### REVIEWS, STANDARDS, AND REGULATIONS

ACGIH TLV-TWA 10 PPM	85INAB 5,252,86
IARC CANCER REVIEW:ANIMAL SUFFICIENT EVIDENCE	IMEMDT 20,429,79
IARC CANCER REVIEW:HUMAN NO ADEQUATE DATA	IMEMDT 20,429,79
IARC CANCER REVIEW:GROUP 2B	IMSUDL 7,56,87
EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION	
FEREAC 54,7740,89	
MSHA STANDARD-AIR:TWA 50 PPM (200 MG/M3)	
DTLVS* 3,79,71	
OSHA PEL:8H TWA 50 PPM;CL 100 PPM;PK 200 PPM/5M/3H	
FEREAC 54,2923,89	
OSHA PEL FINAL:8H TWA 1 PPM (4 MG/M3);STEL 2 PPM (8 MG/M3)	
FEREAC 54,2923,89	
OEL-ARAB REPUBLIC OF EGYPT:TWA 5 PPM (2 MG/M3)	JANUARY 1993
OEL-AUSTRALIA:TWA 10 PPM (40 MG/M3)	JANUARY 1993
OEL-AUSTRIA:TWA 20 PPM (80 MG/M3)	JANUARY 1993
OEL-BELGIUM:TWA 10 PPM (40 MG/M3)	JANUARY 1993
OEL-DENMARK:TWA 1 PPM (4 MG/M3);SKIN	JANUARY 1993
OEL-FINLAND:TWA 10 PPM (40 MG/M3);STEL 20 PPM (80 MG/M3);CARCINOGEN	JANUARY 1993
OEL-FRANCE:TWA 10 PPM (40 MG/M3)	JANUARY 1993
OEL-GERMANY:CARCINOGEN	JANUARY 1993
OEL-HUNGARY:STEL 4 MG/M3;CARCINOGEN	JANUARY 1993
OEL-JAPAN:TWA 10 PPM (40 MG/M3)	JANUARY 1993
OEL-THE NETHERLANDS:TWA 50 PPM (200 MG/M3)	JANUARY 1993
OEL-THE PHILIPPINES:TWA 50 PPM (200 MG/M3)	JANUARY 1993
OEL-RUSSIA:TWA 10 PPM	JANUARY 1993

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CUST#: 6-049-57831  
PO#: CV16  
07-810-760.14-2  
25-1000

PRODUCT #: D8793  
MF: C2H4CL2

NAME: 1,2-DICHLOROETHANE ACS REAGENT

OEL-SWEDEN:TWA 1 PPM (4 MG/M3);STEL 5 PPM (20 MG/M3);SKIN;CARCINOGEN  
JANUARY 1993  
OEL-SWITZERLAND:TWA 10 PPM (40 MG/M3);STEL 20 PPM (80 MG/M3) JANUARY  
1993  
OEL-TURKEY:TWA 50 PPM (200 MG/M3) JANUARY 1993  
OEL-UNITED KINGDOM:TWA 10 PPM (40 MG/M3);STEL 15 PPM (60 MG/M3)  
JANUARY 1993  
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA, NEW ZEALAND, SINGAPORE,  
VIETNAM CHECK ACGIH TLV  
NIOSH REL TO ETHYLENE DICHLORIDE-AIR:10H CA TWA 1 PPM;STEL 2 PPM  
NIOSH\* DHHS #92-100,92  
NOMS 1974: HZD 24130; NIS 92; TNF 7148; NOS 60; TNE 77671  
NOMS 1983: HZD 24130; NIS 38; TNF 2226; NOS 61; TNE 83246; TFE 33361  
ATSDR TOXICOLOGY PROFILE (NTIS\*\* PB/90/171422/AS)  
EPA GENETOX PROGRAM 1988, POSITIVE: CARCINOGENICITY-MOUSE/RAT; CELL  
TRANSFORM.-SA7/SHE  
EPA GENETOX PROGRAM 1988, POSITIVE: D MELANOGASTER-WHOLE SEX CHROM.  
LOSS  
EPA GENETOX PROGRAM 1988, POSITIVE: D MELANOGASTER-NONDISJUNCTION; E  
COLI POLA WITHOUT S9  
EPA GENETOX PROGRAM 1988, POSITIVE: HISTIDINE REVERSION-AMES TEST  
EPA GENETOX PROGRAM 1988, POSITIVE: D MELANOGASTER SEX-LINKED LETHAL  
EPA GENETOX PROGRAM 1988, POSITIVE: CHO GENE MUTATION  
EPA TSCA CHEMICAL INVENTORY, JUNE 1990  
EPA TSCA SECTION 8(F) STATUS REPORT 8EHQ-0979-0310;8EHQ-0778-0228  
ON EPA IRIS DATABASE  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JANUARY 1993  
NIOSH CURRENT INTELLIGENCE BULLETIN 25, 1978, AND BULLETIN 27, 1978  
NIOSH ANALYTICAL METHODS: SEE HYDROCARBONS, HALOGENATED, 1003  
NCI CARCINOGENESIS BIOASSAY (GAVAGE);CLEAR EVIDENCE:MOUSE,RAT  
NCITR\* NCI-TR-55,78  
NTP 7TH ANNUAL REPORT ON CARCINOGENS, 1992 : ANTICIPATED TO BE  
CARCINOGEN  
NTP TOXICITY STUDIES, RPT# TOX-04, AS OF JANUARY 1993  
NTP CARCINOGENESIS STUDIES;SELECTED, JANUARY 1993  
OSHA ANALYTICAL METHOD #03  
THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

SECTION 16. - - - - - OTHER INFORMATION- - - - -

CONTINUED ON NEXT PAGE

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PAGE 8

CUST#: 6-049-57831  
PO#: CV16  
07-810-760.14-2  
25-1000

PRODUCT #: D8793  
MF: C2H4CL2

NAME: 1,2-DICHLOROETHANE ACS REAGENT

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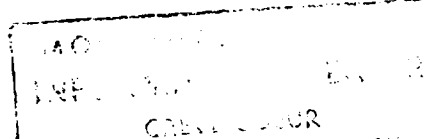
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DATE: 11/04/86  
CUST # 325902 P.O. # VR10558



M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE: 1

IDENTIFICATION

PRODUCT # D6220-9      NAME: TRANS-1,2-DICHLOROETHYLENE, 98%  
CAS # 156-60-5

TOXICITY HAZARDS

RTECS # KV9400000

ETHYLENE, 1,2-DICHLORO-, (E)-

TOXICITY DATA

IPR-RAT LD50:7536 MG/KG

TXCYAC 7,141,77

IPR-MUS LD50:4019 MG/KG

TXCYAC 7,141,77

REVIEWS, STANDARDS, AND REGULATIONS

NTP CARCINOGENESIS STUDIES; SELECTED, MARCH 1986

REPORTED IN EPA TSCA INVENTORY, 1983

EPA TSCA SECTION 8(E) STATUS REPORT 8EHQ-0680-0345;8EHQ-0982-0457;

8EHQ-0979-0310

MEETS CRITERIA FOR PROPOSED OSHA MEDICAL RECORDS RULE FEREAC 47,30420,  
82

HEALTH HAZARD DATA

ACUTE EFFECTS

MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.

VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER  
RESPIRATORY TRACT.

CAUSES SKIN IRRITATION.

PROLONGED CONTACT CAN CAUSE:

NARCOTIC EFFECT.

CHRONIC EFFECTS

LABORATORY EXPERIMENTS HAVE SHOWN MUTAGENIC EFFECTS.

FIRST AID

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS  
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED  
CLOTHING AND SHOES.

IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL  
RESPIRATION, PREFERABLY MOUTH-TO-MOUTH. IF BREATHING IS DIFFICULT,  
GIVE OXYGEN.

CALL A PHYSICIAN.

WASH CONTAMINATED CLOTHING BEFORE REUSE.

PHYSICAL DATA

MELTING POINT: -50 C

BOILING POINT: 48 C

SPECIFIC GRAVITY: 1.257

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 43 F

EXTINGUISHING MEDIA

WATER SPRAY.

CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.

SPECIAL FIRE FIGHTING PROCEDURES

FLAMMABLE LIQUID.

VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION AND  
FLASH BACK.

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PAGE: 2

CATALOG # D6220-9

NAME: TRANS-1,2-DICHLOROETHYLENE, 98%

UNUSUAL FIRE AND EXPLOSION HAZARDS

NOT APPLICABLE

----- REACTIVITY DATA -----

INCOMPATIBILITIES

OXIDIZING AGENTS

MAY DECOMPOSE ON EXPOSURE TO AIR AND MOISTURE.

MAY DECOMPOSE ON EXPOSURE TO LIGHT.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:

HYDROGEN CHLORIDE GAS

CARBON MONOXIDE, CARBON DIOXIDE

PHOSGENE GAS

----- SPILL OR LEAK PROCEDURES -----

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

EVACUATE AREA.

SHUT OFF ALL SOURCES OF IGNITION.

WEAR RESPIRATOR, CHEMICAL SAFETY GOGGLES, RUBBER BOOTS AND HEAVY

RUBBER GLOVES.

ABSORB ON SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR

DISPOSAL.

VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL METHOD

BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER BUT EXERT EXTRA CARE IN IGNITING AS THIS MATERIAL IS HIGHLY FLAMMABLE.

OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

----- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE -----

DO NOT BREATHE VAPOR.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

USE PROTECTIVE CLOTHING, GLOVES AND MASK.

CHEMICAL SAFETY GOGGLES.

USE ONLY IN A CHEMICAL FUME HOOD.

WASH THOROUGHLY AFTER HANDLING.

KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.

PROTECT FROM MOISTURE.

LIGHT-SENSITIVE.

AIR-SENSITIVE.

IRRITANT.

POSSIBLE MUTAGEN.

STORE IN A COOL DRY PLACE.

----- ADDITIONAL PRECAUTIONS AND COMMENTS -----

NOT APPLICABLE

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DATE: 10/30/93  
CUST#: 6-049-57832  
PJ#: EHL1036XMP

## M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 1

### SECTION 1. - - - - - CHEMICAL IDENTIFICATION- - - - -

STOCK #39546-3  
PRODUCT #: T1790 NAME: 1,1,1-TRICHLOROETHANE NEAT STANDARD FOR

### SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - -

CAS #: 71-55-6  
MF: C2H3CL3

#### SYNONYMS

AEROTHENE TT \* CF 2 \* CHLOROETENE \* CHLOROETHENE \* CHLOROETHENE NU \*  
CHLOROFORM, METHYL- \* CHLOROTHANE NU \* CHLOROTHENE \*  
CHLOROTHENE (INHIBITED) \* CHLOROTHENE NU \* CHLOROTHENE SM \*  
CHLOROTHENE VG \* CHLORTEN \* ETHANA NU \* ICI-CF 2 \* INHIBISOL \*  
METHYLCHLOROFORM \* METHYL CHLOROFORM (ACGIH, DOT, OSHA) \*  
METHYLTRICHLOROMETHANE \* NCI-C04626 \* RCRA WASTE NUMBER U226 \*  
SOLVENT 111 \* STROBANE \* ALPHA-T \* TAF CLEAN \* 1,1,1-TCF \* 1,1,1-  
TRICHLOROETHANE (DUTCH) \* 1,1,1-TRICHLORAEETHAN (GERMAN) \*  
TRICHLOROETHANE \* TRICHLORO-1,1,1-ETHANE (FRENCH) \* ALPHA-  
TRICHLOROETHANE \* 1,1,1-TRICHLOROETHANE \* 1,1,1-TRICHLOROETHANE (DOT,  
OSHA) \* 1,1,1-TRICHLOROETAN (ITALIAN) \* TRICHLOROMETHYLMETHANE \* TRI-  
ETHANE \* UN2631 (DOT) \*

### SECTION 3. - - - - - HAZARDS IDENTIFICATION - - - - -

#### LABEL PRECAUTIONARY STATEMENTS

HAZARDOUS  
HAZARDOUS BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.  
POSSIBLE RISK OF IRREVERSIBLE EFFECTS.  
POSSIBLE MUTAGEN.  
CAUSES SEVERE IRRITATION.  
TARGET ORGAN(S):  
LIVER  
KIDNEYS  
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLenty OF  
WATER AND SEEK MEDICAL ADVICE.  
WEAR SUITABLE PROTECTIVE CLOTHING.  
DO NOT BREATHE VAPOR.

### SECTION 4. - - - - - FIRST-AID MEASURES- - - - -

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS

CONTINUED ON NEXT PAGE

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PAGE 2

STOCK #: 39546-3

CUST#: 6-049-57832

PO#: EHL1036XMP

PRODUCT #: T1790  
MF: C2H3CL3

NAME: 1,1,1-TRICHLOROETHANE NEAT STANDARD FOR

AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS WITH FINGERS. IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN. WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION 5. - - - - - FIRE FIGHTING MEASURES - - - - -

EXTINGUISHING MEDIA

WATER SPRAY.  
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIRE FIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES - - - - -

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.  
COVER WITH DRY LIME OR SODA ASH, PICK UP, KEEP IN A CLOSED CONTAINER AND HOLD FOR WASTE DISPOSAL.  
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - HANDLING AND STORAGE - - - - -  
REFER TO SECTION 8.

ADDITIONAL INFORMATION

1,1,1-TRICHLOROETHANE HAS BEEN REPORTED TO REACT VIOLENTLY WITH ACETONE, NITRITES, AND OXYGEN.

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION - - - - -

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR. CHEMICAL-RESISTANT

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M A T E R I A L   S A F E T Y   D A T A   S H E E T      P A G E    3  
 - - - - -

STOCK    #: 39546-3

CUST#: 6-049-57832

PRODUCT #: T1790  
 MF: C2H3CL3

NAME: 1,1,1-TRICHLOROETHANE NEAT STANDARD FOR

PD#: EHL1036XMP

GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.  
 USE ONLY IN A CHEMICAL FUME HOOD.  
 SAFETY SHOWER AND EYE BATH.  
 FACESHIELD (8-INCH MINIMUM).  
 DO NOT BREATHE VAPOR.  
 DO NOT GET IN EYES, ON SKIN, ON CLOTHING.  
 AVOID PROLONGED OR REPEATED EXPOSURE.  
 WASH THOROUGHLY AFTER HANDLING.  
 HARMFUL LIQUID.  
 SEVERE IRRITANT.  
 POSSIBLE MUTAGEN.  
 KEEP TIGHTLY CLOSED.  
 HYGROSCOPIC  
 HANDLE AND STORE UNDER NITROGEN.  
 STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -

DATA NOT AVAILABLE

BOILING POINT: 75 °C  
 MELTING POINT: -35 °C

SECTION 10. - - - - - STABILITY AND REACTIVITY- - - - -

INCOMPATIBILITIES

STRONG OXIDIZING AGENTS  
 ALUMINUM  
 AND ITS ALLOYS.  
 MAGNESIUM  
 AND ITS ALLOYS.  
 ZINC  
 STRONG BASES  
 REACTS VIOLENTLY WITH:  
 POTASSIUM  
 SODIUM

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:  
 CARBON MONOXIDE, CARBON DIOXIDE  
 HYDROGEN CHLORIDE GAS  
 PHOSGENE GAS

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## M A T E R I A L   S A F E T Y   D A T A   S H E E T

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STOCK #: 39546-3

CUST#: 6-049-57832

PRODUCT #: T1750  
MF: C2H3CL3

NAME: 1,1,1-TRICHLOROETHANE NEAT STANDARD FOR

PO#: EHL1036XMP

### SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -

#### ACUTE EFFECTS

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.  
CAUSES SEVERE IRRITATION.  
HIGH CONCENTRATIONS ARE EXTREMELY DESTRUCTIVE TO TISSUES OF THE MUCOUS  
MEMBRANES AND UPPER RESPIRATORY TRACT, EYES AND SKIN.  
SYMPTOMS OF EXPOSURE MAY INCLUDE BURNING SENSATION, COUGHING,  
WHEEZING, LARYNGITIS, SHORTNESS OF BREATH, HEADACHE, NAUSEA AND  
VOMITING.  
EXPOSURE TO AND/OR CONSUMPTION OF ALCOHOL  
MAY INCREASE TOXIC EFFECTS.  
PROLONGED EXPOSURE CAN CAUSE:  
NARCOTIC EFFECT  
DERMATITIS

#### CHRONIC EFFECTS

LABORATORY EXPERIMENTS HAVE SHOWN MUTAGENIC EFFECTS.  
DAMAGE TO THE LIVER  
DAMAGE TO THE KIDNEYS  
TARGET ORGAN(S):  
LIVER, KIDNEYS  
CENTRAL NERVOUS SYSTEM  
CARDIOVASCULAR SYSTEM

RTECS NO: KJ2975C00

ETHANE, 1,1,1-TRICHLORO-

#### IRRITATION DATA

EYE-MAN 450 PPM/8H  
SKN-RBT 5 GM/120-I MLD  
SKN-RBT 20 MG/24H MOD  
EYE-RBT 100 MG MLD  
EYE-RBT 2 MG/24H SFV

#### TOXICITY DATA

ORL-RAT LD50:9600 MG/KG  
IHL-RAT LC50:18000 PPM/4H  
IPR-RAT LD50:3592 MG/KG  
ORL-MUS LD50:6 GM/KG  
IHL-MUS LC50:3911 PPM/2H  
IPR-MUS LD50:3636 MG/KG  
SCU-MUS LD50:16 GM/KG  
ORL-DJG LD50:750 MG/KG  
IPR-DJG LD50:3100 MG/KG  
IHL-CAT LC50:24400 MG/M3  
ORL-RBT LD50:5660 MG/KG

BJIMAG 28,286.71  
AIHAAP 19,353.58  
85JCAE -,94.86  
AIHAAP 19,353.58  
85JCAE -,94.86

GNAMAP 29,45.90  
28ZPAK -,28.72  
FNVRAL 40,411.86  
GNAMAP 29,45.90  
SAIGBL 13,226.71  
SATGRL 13,290.71  
JPETAB 123,224.58  
FMCHA2 -,C310.91  
TXAPA9 10,119.67  
GISAAA 35(8),127.70  
AIHAAP 19,353.58

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### M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 5

STOCK #: 39546-3

CUST#: 6-049-57832

PRODUCT #: T1790  
MF: C2H3CL3

NAME: 1,1,1-TRICHLOROETHANE NEAT STANDARD FOR

PO#: EHL1036XMP

SKN-RBT LD50: >5 GM/KG  
ORL-GPG LD50: 9470 MG/KG  
TARGET ORGAN DATA  
SENSE ORGANS AND SPECIAL SENSES (CONJUNCTIVA IRRITATION)  
BEHAVIORAL (HALLUCINATIONS, DISTORTED PERCEPTIONS)  
BEHAVIORAL (CHANGE IN MOTOR ACTIVITY)  
BEHAVIORAL (IRRITABILITY)  
BEHAVIORAL (CHANGE IN PSYCHOPHYSIOLOGICAL TESTS)  
GASTROINTESTINAL (HYPERMOTILITY, DIARRHEA)  
GASTROINTESTINAL (NAUSEA OR VOMITING)  
GASTROINTESTINAL (OTHER CHANGES)  
SPECIFIC DEVELOPMENTAL ABNORMALITIES (CARDIOVASCULAR SYSTEM)  
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES  
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR  
COMPLETE INFORMATION.

WRPCA2 9,119.70  
ATHAAP 19,353.58

SECTION 12. - - - - - ECOLOGICAL INFORMATION - - - - -  
DATA NOT YET AVAILABLE.

SECTION 13. - - - - - DISPOSAL CONSIDERATIONS - - - - -

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A  
CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.  
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - TRANSPORT INFORMATION - - - - -

CONTACT SIGMA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - REGULATORY INFORMATION - - - - -

REVIEWS, STANDARDS, AND REGULATIONS

ACGIH TLV-TWA 350 PPM; STEL 450 PPM  
IARC CANCER REVIEW: ANIMAL INADEQUATE EVIDENCE  
IARC CANCER REVIEW: HUMAN NO ADEQUATE DATA  
IARC CANCER REVIEW: GROUP 3  
EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION  
FEREAC 54,7740.89  
MSHA STANDARD-AIR: TWA 350 PPM (1900 MG/M3)  
DTLVS\* 3,161.71

MSINAR 5,382.86  
INEMDT 20,515.79  
INEMDT 20,515.79  
IMSUDL 7,56.87

CONTINUED ON NEXT PAGE

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## M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 6

STOCK #: 39546-3

CUST#: 6-049-57832

PN#: EHL1036XMP

PRODUCT #: T1750  
MF: C2H3CL3

NAME: 1,1,1-TRICHLOROETHANE NEAT STANDARD FOR

OSHA PEL: 8H TWA 350 PPM (1900 MG/M3)  
FFREAC 54,2523,89  
OSHA PEL FINAL: 8H TWA 350 PPM (1900 MG/M3); STEL 450 PPM (2450 MG/M3)  
FFREAC 54,2523,89  
OEL-AUSTRALIA: TWA 125 PPM (680 MG/M3) JANUARY 1993  
OEL-BELGIUM: TWA 350 PPM (1910 MG/M3); STEL 450 PPM (2460 MG/M3)  
JANUARY 1993  
OEL-CZECHOSLOVAKIA: TWA 500 MG/M3; STEL 2000 MG/M3 JANUARY 1993  
OEL-DENMARK: TWA 100 PPM (540 MG/M3) JANUARY 1993  
OEL-FINLAND: TWA 100 PPM (540 MG/M3); STEL 250 PPM (1400 MG/M3) JANUARY  
1993  
OEL-FRANCE: TWA 300 PPM (1650 MG/M3); STEL 450 PPM (2500 MG/M3) JANUARY  
1993  
OEL-GERMANY: TWA 200 PPM (1080 MG/M3) JANUARY 1993  
OEL-HUNGARY: TWA 100 MG/M3; STEL 300 MG/M3; SKIN JANUARY 1993  
OEL-JAPAN: TWA 200 PPM (1100 MG/M3) JANUARY 1993  
OEL-THE NETHERLANDS: TWA 200 PPM (1080 MG/M3); STEL 500 PPM (2700 MG/M3)  
JANUARY 1993  
OEL-THE PHILIPPINES: TWA 350 PPM (1900 MG/M3) JANUARY 1993  
OEL-RUSSIA: TWA 200 PPM; STEL 20 MG/M3 JANUARY 1993  
OEL-SWEDEN: TWA 50 PPM (300 MG/M3); STEL 90 PPM (500 MG/M3) JANUARY  
1993  
OEL-SWITZERLAND: TWA 200 PPM (1080 MG/M3); STEL 1000 PPM (5400 MG/M3)  
JANUARY 1993  
OEL-TURKEY: TWA 350 PPM (1900 MG/M3) JANUARY 1993  
OEL-UNITED KINGDOM: TWA 350 PPM (1900 MG/M3); STEL 450 PPM (2450 MG/M3)  
JANUARY 1993  
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA, NEW ZEALAND, SINGAPORE,  
VIETNAM CHECK ACGIH TLV  
NIOSH REL TO 1,1,1-TRICHLOROETHANE-AIR: CL 350 PPM/15M  
NIOSH\* DHHS #92-100,92  
NDS 1974: HZD 46970; NIS 412; TNF 109850; NOS 205; TNE 1511801  
NDS 1982: HZD 46970; NIS 417; TNF 120527; NOS 243; TNE 2528300; TFE  
762399  
EPA GENETOX PROGRAM 1988, POSITIVE: CELL TRANSFORM.-RLV F344 RAT EMBRYO  
EPA GENETOX PROGRAM 1988, NEGATIVE: SPERM MORPHOLOGY-MOUSE  
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: CARCINOGENICITY-MOUSE/RAT;  
MAMMALIAN MICRONUCLEUS  
EPA TSCA CHEMICAL INVENTORY, JUNE 1990  
EPA TSCA R(A) PRELIMINARY ASSESSMENT INFORMATION, FINAL RULE  
FFREAC 47,26992,82  
EPA TSCA SECTION R(E) STATUS REPORT BEHQ-0283-0471  
S: BEHQ-0980-0365; BEHQ-0982-0457

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## M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 7

STOCK #: 29546-3

CUST#: 6-049-57832

PO#: EHL1036XMP

PRODUCT #: T1790  
MF: C2H3CL3

NAME: 1,1,1-TRICHLOROETHANE NEAT STANDARD FOR

EPA TSCA SECTION 8(E) STATUS REPORT BEHQ-0979-0310  
ON EPA IRIS DATABASE  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JANUARY 1993  
NIOSH CURRENT INTELLIGENCE BULLETIN 27, 1978  
NIOSH ANALYTICAL METHODS: SEE HYDROCARBONS, HALOGENATED, 1003  
NCI CARCINOGENESIS BIOASSAY (GAVAGE); INADEQUATE STUDIES: MOUSE, RAT  
NCITR\* NCI-TR-3,77  
NTP CARCINOGENESIS STUDIES; ON TEST (PRECHRONIC STUDIES), JANUARY 1993  
OSHA ANALYTICAL METHOD #14  
THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

### SECTION 16. - - - - - OTHER INFORMATION - - - - -

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800 N LINDBERGH BOULEVARD  
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DATE: 10/13/93  
CUST#: 325902  
PO#: R365012

M A T E R I A L   S A F E T Y   D A T A   S H E E T   P A G E   1

SECTION 1. - - - - - CHEMICAL IDENTIFICATION- - - - -

PRODUCT #: 109479      NAME: BENZOIC ACID, 99%

SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - -

CAS #:65-85-0  
MF: C7H6O2

SYNONYMS

ACIDE BENZOIQUE (FRENCH) \* ACIDO BENZOICO (ITALIAN) \*  
BENZENECARBOXYLIC ACID \* BENZENEFORMIC ACID \* BENZENEMETHANOIC ACID \*  
BENZOATE \* BENZESAEURE (GERMAN) \* CARBOXYBENZENE \* DRACYLIC ACID \*  
Kyselina BENZOVA (CZECH) \* PHENYL CARBOXYLIC ACID \* PHENYLFORMIC  
ACID \* RETARDER BA \* RETARDEX \* SALVO LIQUID \* SALVO POWDER \* TENN-  
PLAS \*

SECTION 3. - - - - - HAZARDS IDENTIFICATION - - - - -

LABEL PRECAUTIONARY STATEMENTS

HARMFUL  
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.  
MAY CAUSE SENSITIZATION BY INHALATION AND SKIN CONTACT.  
CAUSES SEVERE IRRITATION.  
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF  
WATER AND SEEK MEDICAL ADVICE.  
WEAR SUITABLE PROTECTIVE CLOTHING.

SECTION 4. - - - - - FIRST-AID MEASURES- - - - -

IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL  
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IN CASE OF CONTACT WITH EYES, FLUSH WITH COPIOUS AMOUNTS OF WATER  
FOR AT LEAST 15 MINUTES. ASSURE ADEQUATE FLUSHING BY SEPARATING  
THE EYELIDS WITH FINGERS. CALL A PHYSICIAN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.  
CALL A PHYSICIAN.  
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS  
AMOUNTS OF WATER.  
WASH CONTAMINATED CLOTHING BEFORE REUSE.

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 2

CUST#: 325902  
PO#: R365012

PRODUCT #: 109479      NAME: BENZOIC ACID, 99%  
MF: C7H5O2

SECTION 5. - - - - - FIRE FIGHTING MEASURES - - - - -

EXTINGUISHING MEDIA

WATER SPRAY.  
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO  
PREVENT CONTACT WITH SKIN AND EYES.

SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES - - - - -

EVACUATE AREA.  
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY  
RUBBER GLOVES.  
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.  
AVOID RAISING DUST.  
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - HANDLING AND STORAGE - - - - -

REFER TO SECTION 8.

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION - - - - -

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT  
GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.  
USE ONLY IN A CHEMICAL FUME HOOD.  
SAFETY SHOWER AND EYE BATH.  
MECHANICAL EXHAUST REQUIRED.  
DO NOT BREATHE DUST.  
AVOID PROLONGED OR REPEATED EXPOSURE.  
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.  
WASH THOROUGHLY AFTER HANDLING.  
HARMFUL SOLID.  
SEVERE IRRITANT.  
SENSITIZER.  
KEEP TIGHTLY CLOSED.

CONTINUED ON NEXT PAGE

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M A T E R I A L S A F E T Y D A T A S H E E T

PAGE 3

CUST#: 325902  
PO#: R365012

PRODUCT #: 109479 NAME: BENZOIC ACID, 99%  
MF: C7H6O2

STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -

APPEARANCE AND ODOR

WHITE CHIPS AND POWDER  
BOILING POINT: 132.5 C/10MM.  
MELTING POINT: 122 C TO 123 C  
FLASHPOINT 250 F BY:  
AUTOIGNITION TEMPERATURE: 1061 F  
VAPOR PRESSURE: 10MM 132 C  
VAPOR DENSITY: 4.21

SECTION 10. - - - - - STABILITY AND REACTIVITY - - - - -

INCOMPATIBILITIES

STRONG OXIDIZING AGENTS  
STRONG BASES  
STRONG REDUCING AGENTS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:  
CARBON MONOXIDE, CARBON DIOXIDE

SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -

ACUTE EFFECTS

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.  
CAUSES SEVERE IRRITATION.  
MAY CAUSE ALLERGIC RESPIRATORY AND SKIN REACTIONS.  
HIGH CONCENTRATIONS ARE EXTREMELY DESTRUCTIVE TO TISSUES OF THE MUCOUS  
MEMBRANES AND UPPER RESPIRATORY TRACT, EYES AND SKIN.  
SYMPTOMS OF EXPOSURE MAY INCLUDE BURNING SENSATION, COUGHING,  
WHEEZING, LARYNGITIS, SHORTNESS OF BREATH, HEADACHE, NAUSEA AND  
VOMITING.

RTECS NO: DG0875000

BENZOIC ACID

IRRITATION DATA

SKN-HMN 22 MG/3D-I MOD

85DKA8 -,127,77

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 4

CUST#: 325902  
PO#: R365012

PRODUCT #: 109479      NAME: BENZOIC ACID, 99%  
MF: C7H6O2

SKN-RBT 500 MG/24H MLD  
EYE-RBT 100 MG SEV  
TOXICITY DATA  
ORL-MAN LD50:500 MG/KG  
ORL-RAT LD50:1700 MG/KG  
IPR-RAT LD50:1600 MG/KG  
ORL-MUS LD50:1940 MG/KG  
IPR-MUS LD50:1460 MG/KG

BIOFX\* 28-4/73  
BIOFX\* 28-4/73  
FCTXAV 17,715,79  
IPSTB3 3,93,76  
BCFAAI 112,53,73  
IYKEDH 15,359,84  
CRSBAW 160,1097,66

TARGET ORGAN DATA  
BEHAVIORAL (SOMNOLENCE)  
LUNGS, THORAX OR RESPIRATION (DYSPPNAE)  
LUNGS, THORAX OR RESPIRATION (RESPIRATORY DEPRESSION)  
GASTROINTESTINAL (OTHER CHANGES)  
SKIN AND APPENDAGES (AFTER SYSTEMIC EXPOSURE: DERMATITIS, ALLERGIC)  
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES  
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR  
COMPLETE INFORMATION.

SECTION 12. - - - - - ECOLOGICAL INFORMATION - - - - -  
DATA NOT YET AVAILABLE.

SECTION 13. - - - - - DISPOSAL CONSIDERATIONS - - - - -  
DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A  
CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.  
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - TRANSPORT INFORMATION - - - - -  
CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - REGULATORY INFORMATION - - - - -

REVIEWS, STANDARDS, AND REGULATIONS  
EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION  
FEREAC 54,7740,89  
NOHS 1974: HZD 10210; NIS 35; TNF 2798; NOS 52; TNE 77830  
NOES 1983: HZD 10210; NIS 85; TNF 9179; NOS 81; TNE 155176; TFE 55139

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 5

CUST#: 325902  
PO#: R365012

PRODUCT #: 109479      NAME: BENZOIC ACID, 99%  
MF: C7H6O2

EPA GENETOX PROGRAM 1988, NEGATIVE: HISTIDINE REVERSION-AMES TEST; S  
CEREVISIAE-HOMOZYGOSIS  
EPA TSCA CHEMICAL INVENTORY, JUNE 1990  
EPA TSCA SECTION 8(E) STATUS REPORT 8EHQ-1177-0018  
ON EPA IRIS DATABASE  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JANUARY 1993

SECTION 16. - - - - - OTHER INFORMATION - - - - -

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ALDRICH SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL TERMS AND CONDITIONS OF SALE.

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# Monsanto MATERIAL SAFETY DATA

103800  
MONSANTO COMPANY  
INFORMATION CENTER  
CREVE COEUR  
Page 1 of 4

MONSANTO PRODUCT NAME

**PARA-CHLOROANILINE**

MONSANTO COMPANY  
800 N. LINDBERGH BLVD.  
ST. LOUIS, MO 63167

Emergency Phone No.  
(Call Collect)  
314-694-1000

## PRODUCT IDENTIFICATION

103800/

<b>Synonyms:</b>	PCA; 4-Chlorophenylamine; 4-Chloroaniline; p-Chloroaminobenzene; 1-Amino-4-chlorobenzene
<b>Chemical Formula:</b>	C <sub>6</sub> H <sub>6</sub> ClN
<b>CAS No.:</b>	106-47-8
<b>DOT Proper Shipping Name:</b>	Poisonous B, solid n.o.s. (Para-chloroaniline)
<b>DOT Hazard Class/ I.D. No.:</b>	Poison B/UN2811
<b>DOT Label(s):</b>	Poison
<b>Hazardous Substance(s)/ RQ(s):</b>	Not Applicable
<b>U.S. Surface Freight Classification:</b>	Dye Intermediate, NOIBN

## WARNING STATEMENTS

DANGER!  
MAY BE FATAL IF INHALED, SWALLOWED OR ABSORBED THROUGH SKIN  
HOT MELTED MATERIAL CAUSES THERMAL BURNS

## PRECAUTIONARY MEASURES

Do not get in eyes, on skin, on clothing.  
Do not breathe dust or vapor.  
Keep container closed.  
Use only with adequate ventilation.  
Wash thoroughly after handling.  
Avoid contact with hot liquid.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is destroyed. DO NOT REUSE THIS CONTAINER.

## EMERGENCY AND FIRST AID PROCEDURES

POISON  
Call a physician.

FIRST AID: IF IN EYES OR ON SKIN, immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.

IF SWALLOWED, induce vomiting immediately by giving two glasses of water and sticking finger down throat. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

(Emergency And First Aid Procedures Continued On Next Page)

103800

MATERIAL SAFETY DATA

Para-Chloroaniline

**EMERGENCY AND FIRST AID PROCEDURES (Continued)**

IF INHALED, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

IN CASE OF CONTACT WITH HOT LIQUID, treat for thermal effects.

NOTE TO PHYSICIANS: Absorption of this product into the body leads to the formation of methemoglobin which, in sufficient concentration, causes cyanosis. Since reversion of methemoglobin to hemoglobin occurs spontaneously after termination of exposure, moderate degrees of cyanosis need be treated only by supportive measures such as bed rest and oxygen inhalation. Thorough cleansing with soap and water of the entire contaminated area of the body including scalp and nails is of utmost importance as absorption continues until product is removed. If cyanosis is severe, intravenous injection of methylene blue, 1 milligram per kilogram of body weight, may be of value. Observe until stable.

IN CASE OF: SPILL OR LEAK, keep people away. Keep upwind. Shut off leak if without risk. If necessary to enter spill area, wear self-contained breathing apparatus and full protective clothing including boots. Dike to confine liquid until solid. Sweep up or shovel into dry, clean containers. Keep out of sewers, watersheds and waterways.

**OCCUPATIONAL CONTROL PROCEDURES**

Aromatic compounds such as para-chloroaniline are known to cause methemoglobinemia in man following oral, dermal, or inhalation exposure.

**Eye Protection:** Para-chloroaniline does not present significant eye irritation or eye toxicity requiring special protection.

**Skin Protection:** Because p-chloroaniline absorbs through skin, care must be taken to prevent skin contact. Wear protective gloves, rubber boots, and protective long-sleeved clothing when there is potential for skin contact. Wear faceshields and protective aprons when there is potential for splashing of molten material. Launder contaminated clothing before reuse. Wash exposed skin thoroughly with soap and water. Provide safety showers at locations where gross skin contamination with molten material can occur.

**Respiratory Protection:** Use NIOSH approved equipment when airborne exposure limits are exceeded. Consult respirator manufacturer to determine the appropriate type of equipment for a given application.

**Ventilation:** Provide sufficient ventilation to control exposure levels below airborne exposure limits. Local exhaust ventilation is preferred.

**Airborne Exposure Limits:**

Product:	Para-chloroaniline	wt. % 99.7	None Established
	Aniline & other homologues	wt. % 0.3	OSHA PEL: 5 ppm
ACGIH TLV/TWA :		2 ppm	
ACGIH STEL :		5 ppm	

Although no specific exposure limit has been established for para-chloroaniline, OSHA and ACGIH have established the following limits for nuisance dusts:

OSHA PEL/TWA : Total 15 mg/m<sup>3</sup>; Respirable 5 mg/m<sup>3</sup>

ACGIH TLV/TWA : Total 10 mg/m<sup>3</sup>; Respirable 5 mg/m<sup>3</sup>

These limits are stated only to indicate the *least stringent* airborne dust exposure levels applicable to *nuisance* dusts.

**FIRE PROTECTION INFORMATION**

This material is a solid that, when heated and melted, is combustible.

**Flash Point:** 245°F

**Method:** Cleveland Open Cup

(Fire Protection Information Continued On Next Page)

Para-Chloroaniline

MATERIAL SAFETY DATA

**FIRE PROTECTION INFORMATION (Continued)**

**Extinguishing Media:** Water spray, foam, dry chemical, CO<sub>2</sub> or any Class B extinguishing agent.

**Special Firefighting****Procedures:**

Firefighters or others exposed to vapors or products of combustion should wear full protective clothing and self-contained breathing apparatus. Thoroughly decontaminate equipment after use.

**REACTIVITY DATA**

**Materials to Avoid:** Keep away from strong oxidizing agents.

**Hazardous Decomposition****Products:**

CO, CO<sub>2</sub>, NO<sub>x</sub>, HCl, smoke and soot can be produced.

**Hazardous Polymerization:** Does not occur.

**PHYSIOLOGICAL EFFECTS SUMMARY**

Although para-chloroaniline would not be considered toxic on the basis of animal tests, human experience has shown that man is much more sensitive to methemoglobinemia caused by aromatic amino compounds than the rat or the rabbit. Because of the potential for methemoglobin formation, para-chloroaniline should be considered HAZARDOUS by all routes of exposure.

Moderate exposure may cause only cyanosis. Increased exposure may cause anoxia due to the formation of methemoglobin. As oxygen deficiency increases, the cyanosis may be associated with headache, weakness, irritability, drowsiness, dyspnea and unconsciousness. Lethargy and stupor may occur following massive exposure. The appearance of methemoglobinemia may be delayed 6 to 12 hours after exposure.

Oral LD<sub>50</sub> (Rat): 420 mg/kg, Moderately Toxic

Dermal LD<sub>50</sub> (Rabbit) : >398 <631 mg/kg, Moderately Toxic

Eye Irritation (Rabbit) : (FHSA) 12.4 on a scale of 110.0, Slightly Irritating

Skin Irritation (Rabbit) : (FHSA) 0.0 on a scale of 8.0, Practically Nonirritating

No accumulation of para-chloroaniline was observed in reported hand washing studies in humans with C<sup>14</sup>-tagged para-chloroaniline (total para-chloroaniline = 5,000 ppm).

Para-chloroaniline was administered in the diets of rats at 250 and 500 ppm and to mice at 2,500 and 5,000 ppm for 78 weeks followed by a 24-week observation period, respectively. No carcinogenic effect was found.

**PHYSICAL DATA**

**Appearance and Odor:** Yellowish white solid having a slight yellow color and no turbidity in the molten state; darkens with age; slightly sweet odor

**Boiling Point @ 760 mm Hg:** 227°C

**Specific Gravity @ 100°C/20°C:** 1.187

**Melting Point:** 73°C

**Viscosity @ 100°C (centistokes):** 0.883

**Percent Volatile by Volume:** 100%

**Solubility:** Slightly soluble in water (0.010 g/g H<sub>2</sub>O @ 25°C); soluble in hot water; freely soluble in alcohol, ether, acetone, carbon disulfide

**Note:** These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specification items.



## SPILL, LEAK & DISPOSAL INFORMATION

**Waste Disposal:** Dispose of in accordance with all federal, state and local regulations. When discarded, para-chloraniline is currently defined as a *listed toxic waste* (P-024) under RCRA, and its disposal should be in accordance with all applicable federal RCRA regulations. See 40 CFR Part 261.33(e). Since federal, state and local laws may vary, consult your attorney or appropriate regulatory officials for information regarding waste disposal requirements.

Disposal by incineration in an approved hazardous waste incinerator is recommended.

### Spill or Leakage Procedures:

Keep people away. Keep upwind. Liquid causes thermal burns. Shut off leak if without risk. If necessary to enter spill area, wear full protective clothing, including boots. Dike to confine liquid until solid. Sweep up or shovel solids into clean, dry containers. Keep out of sewers, watersheds and waterways. If not possible, notify pollution control authorities.

Follow all protective measures indicated in the "Occupational Control Procedures" section of this document during cleanup operations. Dissolve residual solids with acetone, absorb the solvent mixture with sawdust, attaclay or equivalent, and discard in accordance with RCRA regulations and any applicable state and local waste disposal requirements.

## ADDITIONAL COMMENTS

### Environmental Toxicity Information:

- 48-hr LC<sub>50</sub> *Daphnia magna* : 6.2 mg/l, Moderately Toxic
- 96-hr LC<sub>50</sub> Fathead Minnow : 39 mg/l, Slightly Toxic
- 96-hr LC<sub>50</sub> Rainbow Trout : 14 mg/l, Slightly Toxic
- 48-hr LC<sub>50</sub> Oyster Embryo : 10 mg/l, Moderately Toxic

Para-chloroaniline was evaluated in a semi-continuous activated sludge test at 7 ppm. Primary degradation was approximately 95%. In the river die-away procedure at 1 ppm, para-chloroaniline reached the 50% degradation level in 23 days. Para-chloroaniline is classified as readily degradable.

**DATE:** 11/1/83

**REVISED:** X

**SUPERSEDES:**

MSDS NO.: 000106478

### FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

Product Acceptability Coordinator  
Detergent Materials  
Monsanto Industrial Chemicals Co.  
314-694-2096  
(A Unit of Monsanto Company)

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This form has been approved by the Occupational Safety and Health Administration as "equivalent to" OSHA Form 20.

Para-Chloroaniline

MATERIAL SAFETY DATA



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7/93

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MONSANTO COMPANY

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MSDS COORDINATOR/SAFETY&HEALTH  
800 N LINDBERG BOULEVARD  
ST LOUIS MO 63141-7843

DATE: 07/27/93  
CUST#: 326224  
PO#: 8001811

## M A T E R I A L S A F E T Y D A T A S H E E T

PAGE 1

### IDENTIFICATION

PRODUCT #: 18577-9  
CAS #: 95-57-8  
MF: C6H5ClO

NAME: 2-CHLOROPHENOL, 99+%

### SYNONYMS

O-CHLOROPHENOL \* 2-CHLOROPHENOL \* O-CHLORPHENOL (GERMAN) \* PHENOL, 2-  
CHLORO- \* RCRA WASTE NUMBER U048 \*

### TOXICITY HAZARDS

RTECS #: SK2625000  
PHENOL, O-CHLORO-

### TOXICITY DATA

ORL-RAT LD50: 670 MG/KG  
IPR-RAT LD50: 230 MG/KG  
SCU-RAT LD50: 950 MG/KG  
ORL-MUS LD50: 345 MG/KG  
IPR-MUS LD50: 235 MG/KG  
ORL-MAM LD50: 440 MG/KG

FEPR7 2,76,43  
BJPCAL 13,20,58  
FEPR7 2,76,43  
TOLED5 29,39,85  
JMCMAR 18,868,75  
TIVSAI 33,258,69

### REVIEWS, STANDARDS, AND REGULATIONS

NOHS 1974: HZD 84363; NIS 1; TNF 23; NOS 1; TNE 495  
NOES 1983: HZD 84363; NIS 2; TNF 158; NOS 4; TNE 974; TFE 323  
EPA TSCA CHEMICAL INVENTORY, JUNE 1990  
ON EPA IRIS DATABASE  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JANUARY 1993

### TARGET ORGAN DATA

BEHAVIORAL (TREMOR)  
BEHAVIORAL (CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD)  
BEHAVIORAL (MUSCLE WEAKNESS)  
BEHAVIORAL (MUSCLE CONTRACTION OR SPASTICITY)  
LUNGS, THORAX OR RESPIRATION (RESPIRATORY STIMULATION)  
SKIN AND APPENDAGES (SWEATING)  
NUTRITIONAL AND GROSS METABOLIC (BODY TEMPERATURE INCREASE)  
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES  
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR  
COMPLETE INFORMATION.

### HEALTH HAZARD DATA

### ACUTE EFFECTS

CONTINUED ON NEXT PAGE

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

**PAGE 2**

**CUST#: 326224**  
**PO#: B001811**

**PRODUCT #:**

**NAME: 2-CHLOROPHENOL, 99+%**

**MF: C6H5CLO**

**- - - - - HEALTH HAZARD DATA - - - - -**

**HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.**

**CAUSES BURNS.**

**MATERIAL IS EXTREMELY DESTRUCTIVE TO TISSUE OF THE MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT, EYES AND SKIN.**

**INHALATION MAY BE FATAL AS A RESULT OF SPASM, INFLAMMATION AND EDEMA OF THE LARYNX AND BRONCHI, CHEMICAL PNEUMONITIS AND PULMONARY EDEMA.**

**SYMPTOMS OF EXPOSURE MAY INCLUDE BURNING SENSATION, COUGHING, WHEEZING, LARYNGITIS, SHORTNESS OF BREATH, HEADACHE, NAUSEA AND VOMITING.**

**REPEATED EXPOSURE CAN CAUSE:**

**DAMAGE TO THE LIVER**

**DAMAGE TO THE KIDNEYS**

**FIRST AID**

**IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.**

**ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS WITH FINGERS.**

**IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.**

**IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.**

**CALL A PHYSICIAN.**

**WASH CONTAMINATED CLOTHING BEFORE REUSE.**

**- - - - - PHYSICAL DATA - - - - -**

**BOILING POINT: 175 C TO 176 C**

**MELTING POINT: 8 C**

**SPECIFIC GRAVITY: 1.241**

**APPEARANCE AND ODOR**

**COLORLESS LIQUID**

**- - - - - FIRE AND EXPLOSION HAZARD DATA - - - - -**

**FLASHPOINT 147 F**

**EXTINGUISHING MEDIA**

**CONTINUED ON NEXT PAGE**

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

**PAGE 3**

**CUST#: 326224**  
**PO#: 8001811**

**PRODUCT #:**

**NAME: 2-CHLOROPHENOL, 99+%**

**MF: C6H5ClO**

**F I R E   A N D   E X P L O S I O N   H A Z A R D   D A T A**

**CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.**

**SPECIAL FIREFIGHTING PROCEDURES**

**WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.**  
**COMBUSTIBLE.**

**UNUSUAL FIRE AND EXPLOSIONS HAZARDS**

**EMITS TOXIC FUMES UNDER FIRE CONDITIONS.**

**R E A C T I V I T Y   D A T A**

**INCOMPATIBILITIES**

**ACID CHLORIDES**  
**ACID ANHYDRIDES**  
**OXIDIZING AGENTS**

**HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS**

**TOXIC FUMES OF:**  
**CARBON MONOXIDE, CARBON DIOXIDE**  
**HYDROGEN CHLORIDE GAS**

**S P I L L   O R   L E A K   P R O C E D U R E S**

**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED**

**WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.**  
**COVER WITH DRY LIME OR SODA ASH, PICK UP, KEEP IN A CLOSED CONTAINER AND HOLD FOR WASTE DISPOSAL.**  
**VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.**

**WASTE DISPOSAL METHOD**

**DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.**  
**OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.**

**P R E C A U T I O N S   T O   B E   T A K E N   I N   H A N D L I N G   A N D   S T O R A G E**

**WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.**  
**USE ONLY IN A CHEMICAL FUME HOOD.**  
**SAFETY SHOWER AND EYE BATH.**

**CONTINUED ON NEXT PAGE**

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T**

**PAGE 4**

CUST#: 326224  
PON#: B001811

PRODUCT #:

NAME: 2-CHLOROPHENOL, 99+%

MF: C6H5CLO

**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE**

DO NOT BREATHE VAPOR.  
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.  
WASH THOROUGHLY AFTER HANDLING.  
CORROSIVE.

TOXIC.  
HARMFUL LIQUID AND FUMES.

KEEP TIGHTLY CLOSED.  
KEEP AWAY FROM HEAT AND OPEN FLAME.  
STORE IN A COOL DRY PLACE.

**LABEL PRECAUTIONARY STATEMENTS**

CORROSIVE  
CAUSES BURNS.  
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.  
COMBUSTIBLE.

KEEP AWAY FROM HEAT AND OPEN FLAME.  
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF  
WATER AND SEEK MEDICAL ADVICE.  
TAKE OFF IMMEDIATELY ALL CONTAMINATED CLOTHING.  
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE  
PROTECTION.

**REGULATORY INFORMATION**

THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO  
BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ALDRICH SHALL NOT BE  
HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH  
THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR  
ADDITIONAL TERMS AND CONDITIONS OF SALE.

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1/94

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MONSANTO COMPANY

ATTN BARBARA RASCHE/R3B  
MSDS COORDINATOR/SAFETY&HEALTH  
800 N LINDBERGH BOULEVARD  
ST LOUIS MO 63141-7843

DATE: 01/31/94  
CUST#: 325902  
PO#: R377610

M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 1

SECTION 1. - - - - - CHEMICAL IDENTIFICATION- - - - -

PRODUCT #: B1620-8      NAME: BENZYL ALCOHOL, 99+%

SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - -

CAS #: 100-51-6

MF: C7H8O

SYNONYMS

BENZAL ALCOHOL \* BENZENECARBINOL \* BENZENEMETHANOL \* BENZOYL ALCOHOL \*  
HYDROXYTOLUENE \* ALPHA-HYDROXYTOLUENE \* METHANOL, PHENYL- \* NCI-  
C06111 \* PHENOLCARBINOL \* PHENYL CARBINOL \* PHENYLMETHANOL \*  
PHENYL METHYL ALCOHOL \* ALPHA-TOLUENOL \*

SECTION 3. - - - - - HAZARDS IDENTIFICATION - - - - -

LABEL PRECAUTIONARY STATEMENTS

HARMFUL

HARMFUL IF SWALLOWED.

IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.

RISK OF SERIOUS DAMAGE TO EYES.

TARGET ORGAN(S):

CENTRAL NERVOUS SYSTEM

IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF  
WATER AND SEEK MEDICAL ADVICE.

WEAR SUITABLE PROTECTIVE CLOTHING.

HYGROSCOPIC

SECTION 4. - - - - - FIRST-AID MEASURES- - - - -

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF  
WATER FOR AT LEAST 15 MINUTES.

IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS  
AMOUNTS OF WATER.

IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL  
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.

CALL A PHYSICIAN.

WASH CONTAMINATED CLOTHING BEFORE REUSE.

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 2

CUST#: 325902  
PO#: R377610

PRODUCT #: R016208  
MF: C7H8O

NAME: BENZYL ALCOHOL, 99+%

SECTION 5. - - - - - FIRE FIGHTING MEASURES - - - - -

EXTINGUISHING MEDIA

WATER SPRAY.

CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES - - - - -

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.

COVER WITH DRY LIME OR SODA ASH, PICK UP, KEEP IN A CLOSED CONTAINER AND HOLD FOR WASTE DISPOSAL.

VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - HANDLING AND STORAGE - - - - -

REFER TO SECTION 8.

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION - - - - -

CHEMICAL SAFETY GOGGLES.

RUBBER GLOVES.

NIOSH/MSHA-APPROVED RESPIRATOR.

SAFETY SHOWER AND EYE BATH.

MECHANICAL EXHAUST REQUIRED.

DO NOT BREATHE VAPOR.

AVOID CONTACT WITH EYES, SKIN AND CLOTHING.

WASH THOROUGHLY AFTER HANDLING.

SEVERE EYE IRRITANT.

HARMFUL LIQUID.

KEEP TIGHTLY CLOSED.

STORE IN A COOL DRY PLACE.

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M A T E R I A L S A F E T Y D A T A S H E E T

PAGE 3

CUST#: 325902  
PO#: R377610

PRODUCT #: B016208  
MF: C7H8O

NAME: BENZYL ALCOHOL, 99+%

SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -

APPEARANCE AND ODOR

COLORLESS LIQUID

BOILING POINT: 205 C

MELTING POINT: -15 C

FLASHPOINT 201 F

93C

AUTOIGNITION TEMPERATURE: 816 F

VAPOR PRESSURE: 3.75MM 77 C

435C  
13.3MM 100 C

VAPOR DENSITY: 3.7

SPECIFIC GRAVITY: 1.045

SECTION 10. - - - - - STABILITY AND REACTIVITY - - - - -

INCOMPATIBILITIES

STRONG OXIDIZING AGENTS

A MIXTURE OF BENZYL ALCOHOL AND 58% SULFURIC ACID DECOMPOSED VIOLENTLY WHEN HEATED TO 180 C. BENZYL ALCOHOL CONTAINING 1.4% HYDROGEN BROMIDE AND 1.1% OF AN IRON(2) SALT POLYMERIZED EXOTHERMALLY WHEN HEATED ABOVE 100 C.

MAY DECOMPOSE ON EXPOSURE TO MOIST AIR OR WATER.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:

CARBON MONOXIDE, CARBON DIOXIDE

SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -

ACUTE EFFECTS

HARMFUL IF SWALLOWED.

MAY BE HARMFUL IF INHALED.

MAY BE HARMFUL IF ABSORBED THROUGH THE SKIN.

CAUSES SEVERE EYE IRRITATION.

CAUSES SKIN IRRITATION.

MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.

CAN CAUSE CNS DEPRESSION.

TARGET ORGAN(S):

CENTRAL NERVOUS SYSTEM

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 4

CUST#: 325902  
PO#: R377610

PRODUCT #: B016208  
MF: C7H8O

NAME: BENZYL ALCOHOL, 99+%

RTECS NO: DN3150000

BENZYL ALCOHOL

IRRITATION DATA

SKN-MAN 16 MG/48H MLD  
SKN-RBT 10 MG/24H OPEN MLD  
SKN-RBT 100 MG/24H MLD  
EYE-RBT 750 UG OPEN SEV  
SKN-PIG 100% MLD

CTOIDG 94(8),41,79  
AMHBC 4,119,51  
CTOIDG 94(8),41,79  
AMHBC 4,119,51  
FCTXAV 11,1011,73

TOXICITY DATA

ORL-RAT LD50:1230 MG/KG  
IPR-RAT LD50:400 MG/KG  
IVN-RAT LD50:53 MG/KG  
IAT-RAT LD50:441 MG/KG  
ORL-MUS LD50:1580 MG/KG  
IPR-MUS LD50:650 MG/KG  
IVN-MUS LD50:324 MG/KG  
ORL-RBT LD50:1040 MG/KG  
SKN-RBT LD50:2 GM/KG  
ORL-BWD LD50:100 MG/KG

FCTXAV 2,327,64  
NPIRI\* 1,6,74  
TXAPA9 18,60,71  
TXAPA9 18,60,71  
FCTXAV 2,327,64  
JPMSAE 75,702,86  
AIPTAK 135,330,62  
JPETAB 84,358,45  
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TXAPA9 21,315,72

TARGET ORGAN DATA

SENSE ORGANS AND SPECIAL SENSES (MIOSIS)

BEHAVIORAL (ALTERED SLEEP TIME)

BEHAVIORAL (SOMNOLENCE)

BEHAVIORAL (TREMOR)

BEHAVIORAL (EXCITEMENT)

BEHAVIORAL (ATAXIA)

BEHAVIORAL (COMA)

LUNGS, THORAX OR RESPIRATION (CHRONIC PULMONARY EDEMA OR CONGESTION)

LUNGS, THORAX OR RESPIRATION (DYSPPNAE)

LUNGS, THORAX OR RESPIRATION (OTHER CHANGES)

GASTROINTESTINAL (HYPERMOTILITY, DIARRHEA)

KIDNEY, URETER, BLADDER (OTHER CHANGES)

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES  
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR  
COMPLETE INFORMATION.

SECTION 12. - - - - - ECOLOGICAL INFORMATION - - - - -  
DATA NOT YET AVAILABLE.

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 5

CUST#: 325902  
PO#: R377610

PRODUCT #: B016208  
MF: C7H8O

NAME: BENZYL ALCOHOL, 99+%

SECTION 13. - - - - - DISPOSAL CONSIDERATIONS - - - - -

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A  
CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.  
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - TRANSPORT INFORMATION - - - - -

CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - REGULATORY INFORMATION - - - - -

REVIEWS, STANDARDS, AND REGULATIONS

EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION  
FEREAC 54,7740,89

OEL-RUSSIA:STEL 5 MG/M3;SKIN JANUARY 1993

OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA, NEW ZEALAND, SINGAPORE,

VIETNAM CHECK ACGIH TLV

NOHS 1974: HZD 11360; NIS 85; TNF 7284; NOS 68; TNE 138757

NOES 1983: HZD 11360; NIS 128; TNF 19005; NOS 127; TNE 404916; TFE  
236470

EPA GENETOX PROGRAM 1988, NEGATIVE: E COLI POLA WITHOUT S9

EPA TSCA CHEMICAL INVENTORY, JANUARY 1993

EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, SEPTEMBER 1993

NTP CARCINOGENESIS STUDIES (GAVAGE);NO EVIDENCE:RAT,MOUSE

NTPTR\* NTP-TR-343,89

SECTION 16. - - - - - OTHER INFORMATION - - - - -

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 6

CUST#: 325902  
PO#: R377610

PRODUCT #: B016208  
MF: C7H8O

NAME: BENZYL ALCOHOL, 99+%

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113246  
8/91

ATTN: SAFETY DIRECTOR  
MONSANTO COMPANY

ROBYN CRANDALL R3B  
800 N LINDBERGH BLVD  
ST LOUIS MO 63167

DATE: 08/26/91  
CUST#: 325902  
PO#: R272518

M A T E R I A L   S A F E T Y   D A T A   S H E E T   P A G E   1

IDENTIFICATION

PRODUCT #: C8575-1      NAME: P-CRESOL, 99%  
CAS #: 106-44-5  
MF: C7H8O

SYNONYMS

4-CRESOL \* P-CRESOL (DOT, OSHA) \* P-CRESYLIC ACID \* 1-HYDROXY-4-METHYLBENZENE \* P-HYDROXYTOLUENE \* 4-HYDROXYTOLUENE \* P-KRESOL \* P-METHYLHYDROXYBENZENE \* 1-METHYL-4-HYDROXYBENZENE \* P-METHYLPHENOL \* 4-METHYLPHENOL \* P-OXYTOLUENE \* PARA-CRESOL \* PARAMETHYL PHENOL \* PHENOL, 4-METHYL- (9CI) \* RCRA WASTE NUMBER U052 \* P-TOLUOL \* P-TOLYL ALCOHOL \* UN 2076 (DOT) \*

TOXICITY HAZARDS

RTECS NO: G06475000

P-CRESOL

IRRITATION DATA

SKN-RBT 517 MG/24H SEV  
EYE-RBT 103 MG SEV

BIOFX\* 5-5/69  
BIOFX\* 5-5/69

TOXICITY DATA

ORL-RAT LD50: 207 MG/KG  
SKN-RAT LD50: 750 MG/KG  
UNR-RAT LD50: 1440 MG/KG  
ORL-MUS LD50: 344 MG/KG  
IPR-MUS LD50: 25 MG/KG  
UNR-MUS LD50: 160 MG/KG  
SKN-RBT LD50: 301 MG/KG

BIOFX\* 5-5/69  
GTPZAB 18(2), 58, 74  
GTPPAF 8, 145, 72  
GTPZAB 18(2), 58, 74  
HBTXAC 5, 58, 59  
BJCAAT 6, 160, 52  
BIOFX\* 5-5/69

REVIEWS, STANDARDS, AND REGULATIONS

MSHA STANDARD-AIR: TWA 5 PPM (22 MG/M3) DTLVS\* 3, 61, 71  
OSHA PEL: 8H TWA 5 PPM (22 MG/M3) (SKIN) FEREAC 54, 2923, 89  
OSHA PEL FINAL: 8H TWA 5 PPM (22 MG/M3) (SKIN) FEREAC 54, 2923, 89  
NIOSH REL TO CRESOL-AIR: 10H TWA 10 MG/M3 MMWR\* 37(S-7), 10, 88  
NIHS 1974: HZD 84266; NIS 48; TNF 4394; NOS 34; TNE 33253  
NOES 1983: HZD 84266000; TNF 8; NIS 1057; NOS 14; TNE 21313; TFE 16798  
EPA TSCA CHEMICAL INVENTORY, JUNE 1990  
EPA TSCA 8(A) PRELIMINARY ASSESSMENT INFORMATION, FINAL RULE FEREAC 47, 26992, 82  
ON EPA IRIS DATABASE  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, MARCH 1991  
NIOSH ANALYTICAL METHODS: SEE CRESOLS, 2001; PHENOL AND P-CRESOL IN URINE, 8305  
NTP CARCINOGENESIS STUDIES: TEST COMPLETED (POST PEER REVIEW), APRIL 1991

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS)

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M A T E R I A L   S A F E T Y   D A T A   S H E E T   P A G E   2

CUST#: 325902  
PO#: R272518

PRODUCT #: C8575-1  
CAS #: 106-44-5  
MF: C7H8O

NAME: P-CRESOL, 99%

----- TOXICITY HAZARDS -----

DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

----- HEALTH HAZARD DATA -----

ACUTE EFFECTS

MAY BE FATAL IF INHALED, SWALLOWED, OR ABSORBED THROUGH SKIN.  
CAUSES BURNS.  
MATERIAL IS EXTREMELY DESTRUCTIVE TO TISSUE OF THE MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT, EYES AND SKIN.  
INHALATION MAY BE FATAL AS A RESULT OF SPASM, INFLAMMATION AND EDEMA OF THE LARYNX AND BRONCHI, CHEMICAL PNEUMONITIS AND PULMONARY EDEMA.  
SYMPTOMS OF EXPOSURE MAY INCLUDE BURNING SENSATION, COUGHING, WHEEZING, LARYNGITIS, SHORTNESS OF BREATH, HEADACHE, NAUSEA AND VOMITING.

EXPOSURE CAN CAUSE:  
DAMAGE TO THE EYES  
DAMAGE TO THE KIDNEYS  
TARGET ORGAN(S):  
CENTRAL NERVOUS SYSTEM  
LUNGS  
LIVER, KIDNEYS

FIRST AID

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.  
ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS WITH FINGERS.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.  
CALL A PHYSICIAN.  
REMOVE AND WASH CONTAMINATED CLOTHING PROMPTLY.  
DISCARD CONTAMINATED SHOES.

----- PHYSICAL DATA -----

BOILING PT: 202 C  
MELTING PT: 32 C TO 34 C  
SPECIFIC GRAVITY: 1.034  
VAPOR DENSITY: 3.72  
VAPOR PRESSURE: 1 MM @ 20 C

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T** PAGE 3

CUST#: 325902  
PO#: R272518

PRODUCT #: C8575-1  
CAS #: 106-44-5  
MF: C7H8O

NAME: P-CRESOL, 99%

**----- PHYSICAL DATA -----**

APPEARANCE AND ODOR  
WHITE SOLID

**----- FIRE AND EXPLOSION HAZARD DATA -----**

FLASHPOINT: 193 F  
AUTOIGNITION TEMPERATURE: 1038 F  
LOWER EXPLOSION LEVEL: 1.1% @ 150 C  
UPPER EXPLOSION LEVEL: 1%

EXTINGUISHING MEDIA  
WATER SPRAY.

CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO  
PREVENT CONTACT WITH SKIN AND EYES.  
COMBUSTIBLE.

**----- REACTIVITY DATA -----**

INCOMPATIBILITIES  
OXIDIZING AGENTS  
BASES

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS  
CARBON MONOXIDE, CARBON DIOXIDE

**----- SPILL OR LEAK PROCEDURES -----**

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

EVACUATE AREA.

SHUT OFF ALL SOURCES OF IGNITION.

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY  
RUBBER GLOVES.

SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.

AVOID RAISING DUST.

VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL METHOD

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A  
CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.  
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

**--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---**

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT

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M A T E R I A L   S A F E T Y   D A T A   S H E E T   P A G E   4

CUST#: 325902  
PO#: R272518

PRODUCT #: C8575-1  
CAS #: 106-44-5  
MF: C7H8O

NAME: P-CRESOL, 99%

----- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE -----

GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.

USE ONLY IN A CHEMICAL FUME HOOD.

SAFETY SHOWER AND EYE BATH.

FACESHIELD (8-INCH MINIMUM).

DO NOT BREATHE DUST.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

AVOID PROLONGED OR REPEATED EXPOSURE.

READILY ABSORBED THROUGH SKIN.

WASH THOROUGHLY AFTER HANDLING.

HIGHLY TOXIC.

CORROSIVE.

KEEP TIGHTLY CLOSED.

KEEP AWAY FROM HEAT AND OPEN FLAME.

HYGROSCOPIC

STORE IN A COOL DRY PLACE.

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ATTN BARBARA RASCHE/R3B  
MSDS COORDINATOR/SAFETY&HEALTH  
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ST LOUIS MO 63141

DATE 11/06/92  
CUST#: 326135  
PO#: V324974

M A T E R I A L   S A F E T Y   D A T A   S H E E T   P A G E   1

- - - - IDENTIFICATION - - - -

PRODUCT #: 38374-0  
CAS #: 105-67-9 NAME: 2,4-DIMETHYLPHENOL, TECH., 90%  
MF: CBH100

SYNONYMS

2,4-DIMETHYLPHENOL \* 4,6-DIMETHYLPHENOL \* 1-HYDROXY-2,4-DIMETHYLBENZENE \* RCRA WASTE NUMBER U101 \* M-XYLENOL \*

- - - - TOXICITY HAZARDS - - - -

RTECS #: ZE5600000  
2,4-XYLENOL

TOXICITY DATA

ORL-RAT LD50:3200 MG/KG	GTPZAB 18(2),58,74
SKN-RAT LD50:1040 MG/KG	GTPZAB 18(2),58,74
ORL-MUS LD50:809 MG/KG	GTPZAB 18(2),58,74
IPR-MUS LD50:183 MG/KG	JMCMAR 18,868,75
IVN-MUS LD50:100 MG/KG	JMCMAR 23,1350,80

REVIEWS, STANDARDS, AND REGULATIONS

EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION  
FEREAC 54,4388,89  
NOES 1983: HZO X2332; NIS 7; TNF 736; NOS 8; TNE 12254; TFE 786  
EPA TSCA CHEMICAL INVENTORY, JUNE 1990  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JULY 1992

TARGET ORGAN DATA

BEHAVIORAL (SLEEP)  
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES  
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR  
COMPLETE INFORMATION.

- - - - HEALTH HAZARD DATA - - - -

ACUTE EFFECTS

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.  
CAUSES BURNS.  
MATERIAL IS EXTREMELY DESTRUCTIVE TO TISSUE OF THE MUCOUS MEMBRANES  
AND UPPER RESPIRATORY TRACT, EYES AND SKIN.  
INHALATION MAY BE FATAL AS A RESULT OF SPASM, INFLAMMATION AND EDEMA  
OF THE LARYNX AND BRONCHI, CHEMICAL PNEUMONITIS AND PULMONARY EDEMA.  
SYMPTOMS OF EXPOSURE MAY INCLUDE BURNING SENSATION, COUGHING.

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 2

CUST#: 326135  
PO#: V324974

PRODUCT #:

MF: C8H100

NAME: 2,4-DIMETHYLPHENOL, TECH., 90%

- - - - HEALTH HAZARD DATA - - - -

WHEEZING, LARYNGITIS, SHORTNESS OF BREATH, HEADACHE, NAUSEA AND VOMITING.

FIRST AID

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.  
ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS WITH FINGERS.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.  
CALL A PHYSICIAN.  
DISCARD CONTAMINATED CLOTHING AND SHOES.

- - - - PHYSICAL DATA - - - -

BOILING POINT: 212 C  
SPECIFIC GRAVITY: 1.027

APPEARANCE AND ODOR  
COLORLESS LIQUID

- - - - FIRE AND EXPLOSION HAZARD DATA - - - -

FLASHPOINT >230

EXTINGUISHING MEDIA

WATER SPRAY.  
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 3

CUST#: 326135  
PO#: V324974

PRODUCT #:

MF: C8H10O

NAME:

2,4-DIMETHYLPHENOL, TECH., 90%

- - - - FIRE AND EXPLOSION HAZARD DATA - - - -

UNDER FIRE CONDITIONS, MATERIAL MAY DECOMPOSE  
TO FORM FLAMMABLE AND/OR EXPLOSIVE MIXTURES IN AIR.

- - - - REACTIVITY DATA - - - -

INCOMPATIBILITIES

BASES  
ACID CHLORIDES  
ACID ANHYDRIDES  
OXIDIZING AGENTS  
CORRODES STEEL  
BRASS  
COPPER, COPPER ALLOYS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:  
CARBON MONOXIDE, CARBON DIOXIDE

- - - - SPILL OR LEAK PROCEDURES - - - -

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

EVACUATE AREA.  
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY  
RUBBER GLOVES.  
COVER WITH DRY LIME OR SODA ASH, PICK UP, KEEP IN A CLOSED CONTAINER  
AND HOLD FOR WASTE DISPOSAL.  
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL METHOD

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A  
CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

- - - - PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE - - - -

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT  
GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.  
USE ONLY IN A CHEMICAL FUME HOOD.  
SAFETY SHOWER AND EYE BATH.  
FACESHIELD (8-INCH MINIMUM).  
DO NOT BREATHE VAPOR.  
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.  
AVOID PROLONGED OR REPEATED EXPOSURE.

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T

PAGE 4

CUST#: 326135  
PO#: V324974

PRODUCT #:

NAME:

2,4-DIMETHYLPHENOL, TECH., 90%

MF: C8H10O

- - - - PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE - - - -

READILY ABSORBED THROUGH SKIN.  
WASH THOROUGHLY AFTER HANDLING.

TOXIC.

CORROSIVE.

KEEP TIGHTLY CLOSED.

STORE IN A COOL DRY PLACE.

LABEL PRECAUTIONARY STATEMENTS

TOXIC

TOXIC BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.

CAUSES BURNS.

IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW THE LABEL WHERE POSSIBLE).

IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE.

AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH PLENTY OF WATER.

TAKE OFF IMMEDIATELY ALL CONTAMINATED CLOTHING.

WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE PROTECTION.

REGULATORY INFORMATION

THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ALDRICH SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL TERMS AND CONDITIONS OF SALE.

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114447  
10/92  
DATE: 10/27/92  
CUST#: 326097  
PO#: B001806

**M A T E R I A L   S A F E T Y   D A T A   S H E E T**      **P A G E   1**

**IDENTIFICATION**

PRODUCT #: 17105-0  
CAS #: 118-74-1  
MF: C6CL6

NAME: HEXACHLOROBENZENE, 99%

**SYNONYMS**

AMATIN \* ANTICARIE \* BUNT-CURE \* BUNT-NO-MORE \* CEKU C.B. \* CO-OP  
HEXA \* ESACLOROBENZENE (ITALIAN) \* GRANOX NM \* HCB \* HEXA C.B. \*  
HEXACHLOROBENZOL (GERMAN) \* HEXACHLOROBENZENE \* JULIN'S CARBON  
CHLORIDE \* NO BUNT \* NO BUNT 40 \* NO BUNT 80 \* NO BUNT LIQUID \*  
PENTACHLOROPHENYL CHLORIDE \* PERCHLOROBENZENE \* PHENYL PERCHLORYL \*  
RCRA WASTE NUMBER U127 \* SAATBEIZFUNGIZID (GERMAN) \* SANOCIO \*  
SANOCIDE \* SMUT-GO \* SNIECIOTOX \*

**TOXICITY HAZARDS**

RTECS NO: DA2975000

BENZENE, HEXACHLORO-

**TOXICITY DATA**

UNR-MAN LDLO: 220 MG/KG  
ORL-RAT LD50: 10 GM/KG  
IHL-RAT LC50: 3600 MG/M3  
ORL-MUS LD50: 4 GM/KG  
IHL-MUS LC50: 4 GM/M3  
SCU-MUS LD50: >10 GM/KG  
ORL-CAT LD50: 1700 MG/KG  
IHL-CAT LC50: 1600 MG/M3  
ORL-RBT LD50: 2600 MG/KG  
IHL-RBT LC50: 1800 MG/M3  
ORL-GPG LD50: >3 GM/KG  
ORL-QAL LD50: >6400 MG/KG  
ORL-MAM LD50: 1047 MG/KG

85DCAI 2,73,70  
FMCHA2 -,C163,91  
85GHAT -,72,82  
85GHAT -,72,82  
85GHAT -,72,82  
SRTCAC 36(1-4),10,89  
85GHAT -,72,82  
85GHAT -,72,82  
85GHAT -,72,82  
85GHAT -,72,82  
PEMNDP 9,469,91  
MFLRA3 38,709,73  
NTIS\*\* PB288-416

**REVIEWS, STANDARDS, AND REGULATIONS**

IARC CANCER REVIEW: ANIMAL SUFFICIENT EVIDENCE IMEMDT 20,155,79  
IARC CANCER REVIEW: HUMAN INADEQUATE EVIDENCE IMSUDL 7,219,87  
IARC CANCER REVIEW: GROUP 2B IMSUDL 7,219,87  
NOES 1983: HZD A1753; NIS 2; TNF 10; NOS 12; TNE 1038; TFE 26  
EPA GENETOX PROGRAM 1988, POSITIVE: CARCINOGENICITY-MOUSE/RAT  
EPA GENETOX PROGRAM 1988, NEGATIVE: RODENT DOMINANT LETHAL  
EPA TSCA CHEMICAL INVENTORY, JUNE 1990  
ON EPA IRIS DATABASE  
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JULY 1992  
NTP SIXTH ANNUAL REPORT ON CARCINOGENS, 1991: ANTICIPATED TO BE  
CARCINOGEN

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T** PAGE 2

CUST#: 326097  
PO#: 8001806

PRODUCT #: 17105-0  
CAS #: 118-74-1  
MF: C6CL6

NAME: HEXACHLOROBENZENE, 99%

**----- TOXICITY HAZARDS -----**

**TARGET ORGAN DATA**

BEHAVIORAL (SOMNOLENCE)  
LIVER (TUMORS)  
ENDOCRINE (THYROID TUMORS)  
SPECIFIC DEVELOPMENTAL ABNORMALITIES (CRANIOFACIAL)  
SPECIFIC DEVELOPMENTAL ABNORMALITIES (MUSCULOSKELETAL SYSTEM)  
SPECIFIC DEVELOPMENTAL ABNORMALITIES (UROGENITAL SYSTEM)  
EFFECTS ON NEWBORN (LIVE BIRTH INDEX)  
EFFECTS ON NEWBORN (VIABILITY INDEX)  
EFFECTS ON NEWBORN (WEANING OR LACTATION INDEX)  
EFFECTS ON NEWBORN (GROWTH STATISTICS)  
EFFECTS ON NEWBORN (BIOCHEMICAL AND METABOLIC)  
TUMORIGENIC (CARCINOGENIC BY RTECS CRITERIA)  
TUMORIGENIC (NEOPLASTIC BY RTECS CRITERIA)  
BIOCHEMICAL EFFECTS (PORPHYRIN INCLUDING BILE PIGMENTS)

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS)  
DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

**----- HEALTH HAZARD DATA -----**

**ACUTE EFFECTS**

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.  
CAUSES EYE AND SKIN IRRITATION.  
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER  
RESPIRATORY TRACT.  
CAUSES PHOTOSENSITIVITY. EXPOSURE TO LIGHT CAN RESULT IN ALLERGIC  
REACTIONS RESULTING IN DERMATOLOGIC LESIONS, WHICH CAN VARY FROM  
SUNBURNLIKE RESPONSES TO EDEMATOUS, VESICULATED LESIONS OR BULLAE.

**CHRONIC EFFECTS**

CARCINOGEN.  
MAY ALTER GENETIC MATERIAL.  
TARGET ORGAN(S):

LIVER

**FIRST AID**

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS  
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED  
CLOTHING AND SHOES.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T** **PAGE 3**

**CUST#: 326097**  
**PO#: B001806**

**PRODUCT #: 17105-0**  
**CAS #: 118-74-1**  
**MF: C6CL6**

**NAME: HEXACHLOROBENZENE, 99%**

**----- HEALTH HAZARD DATA -----**

**RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.**  
**IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.**  
**CALL A PHYSICIAN.**  
**DISCARD CONTAMINATED CLOTHING AND SHOES.**

**----- PHYSICAL DATA -----**

**BOILING PT: 323 C TO 326 C**  
**MELTING PT: 227 C TO 229 C**  
**APPEARANCE AND ODOR**  
**WHITE POWDER**

**----- FIRE AND EXPLOSION HAZARD DATA -----**

**EXTINGUISHING MEDIA**  
**WATER SPRAY.**  
**CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.**  
**SPECIAL FIREFIGHTING PROCEDURES**  
**WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO**  
**PREVENT CONTACT WITH SKIN AND EYES.**  
**UNUSUAL FIRE AND EXPLOSIONS HAZARDS**  
**EMITS TOXIC FUMES UNDER FIRE CONDITIONS.**

**----- REACTIVITY DATA -----**

**INCOMPATIBILITIES**  
**STRONG OXIDIZING AGENTS**  
**HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS**  
**TOXIC FUMES OF:**  
**CARBON MONOXIDE, CARBON DIOXIDE**  
**HYDROGEN CHLORIDE GAS**

**----- SPILL OR LEAK PROCEDURES -----**

**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED**  
**EVACUATE AREA.**  
**WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY**  
**RUBBER GLOVES.**  
**WEAR DISPOSABLE COVERALLS AND DISCARD THEM AFTER USE.**

**CONTINUED ON NEXT PAGE**

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**M A T E R I A L   S A F E T Y   D A T A   S H E E T** PAGE 4

CUST#: 326097  
PO#: B001806

PRODUCT #: 17105-0  
CAS #: 118-74-1  
MF: C6CL6

NAME: HEXACHLOROBENZENE, 99%

**----- SPILL OR LEAK PROCEDURES -----**

SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.  
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.  
WASTE DISPOSAL METHOD  
DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A  
CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

**--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---**

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT  
GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.  
SAFETY SHOWER AND EYE BATH.  
USE ONLY IN A CHEMICAL FUME HOOD.  
DO NOT BREATHE DUST.  
AVOID ALL CONTACT.  
WASH THOROUGHLY AFTER HANDLING.  
CARCINOGEN.  
IRRITANT.  
PHOTOSENSITIZER.  
MUTAGEN.  
HARMFUL SOLID.  
KEEP TIGHTLY CLOSED.  
STORE IN A COOL DRY PLACE.

**LABEL PRECAUTIONARY STATEMENTS**

TOXIC  
MAY CAUSE CANCER.  
MAY CAUSE HERITABLE GENETIC DAMAGE.  
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.  
MAY CAUSE SENSITIZATION BY INHALATION AND SKIN CONTACT.  
MUTAGEN.  
PHOTOSENSITIZER.  
TARGET ORGAN(S):  
LIVER

IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW THE LABEL WHERE  
POSSIBLE).  
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF  
WATER AND SEEK MEDICAL ADVICE.  
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE  
PROTECTION.

**REGULATORY INFORMATION**

THIS PRODUCT IS SUBJECT TO SARA SECTION 313 REPORTING REQUIREMENTS.

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T      P A G E   5

CUST#: 326097  
PO#: 8001806

PRODUCT #: 17105-0  
CAS #: 118-74-1  
MF: C6CL6

NAME: HEXACHLOROBENZENE, 99%

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112085

MONSANTO PRODUCT NAME  
**ORTHO-DICHLOROBENZENE**

MONSANTO COMPANY  
800 N. LINDBERGH BLVD.  
ST. LOUIS, MO 63167

**Emergency Phone No.**  
**(Call Collect)**  
**314-694-1000**

## PRODUCT IDENTIFICATION

**Synonyms:** ortho-Dichlorobenzene, ODCB

**Chemical Name:** Benzene, 1,2-dichloro

**Chemical Formula:**  $C_6H_4Cl_2$

**CAS No.:** 95-50-1

**DOT Proper Shipping Name:** Combustible Liquid, N.O.S. (orthodichlorobenzene) Dichlorobenzene, ortho, Liquid (Less than 110 Gallons)

**DOT Hazard Class/ I.D. No.:** Combustible Liquid/NA1993  
ORM-A/UN1591 (Less than 110 Gallons)

**Label Requirement(s):** Product Label

**Reportable Quantity (RQ) Under U.S. Clean Water Act Regulations:** Dichlorobenzene, 100 lbs. (45.4 kg)

**U.S. Surface Freight Classification:** ortho-Dichlorobenzene

MONSANTO COMPANY  
INFORMATION CENTER  
CREVE COEUR

## WARNING STATEMENTS

WARNING!  
CAUSES IRRITATION TO EYES, SKIN AND RESPIRATORY TRACT  
COMBUSTIBLE  
REPEATED EXCESSIVE EXPOSURE CAN CAUSE LIVER AND KIDNEY DAMAGE

## PRECAUTIONARY MEASURES

Keep away from heat, sparks, and flame.

Avoid contact with eyes, skin and clothing. Wear chemical goggles and rubber gloves.

Avoid breathing vapors. Handle only in areas with sufficient ventilation to prevent exposure or wear suitable respirator.

Wash thoroughly after handling.

Keep container closed.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed. DO NOT CUT OR WELD ON OR NEAR THIS CONTAINER.

## EMERGENCY AND FIRST AID PROCEDURES

**FIRST AID:** IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Call a physician.

IF ON SKIN, immediately wash with soap and plenty of water. Remove contaminated clothing. Wash clothing before reuse.

112085

MATERIAL SAFETY DATA

ORTHO-DICHLOROBENZENE

DESK COPY  
DO NOT DUPLICATE

## OCCUPATIONAL CONTROL PROCEDURES

<b>Eye Protection:</b>	Wear chemical safety goggles to prevent eye contact.
<b>Skin Protection:</b>	Wear appropriate impervious gloves and protective clothing to prevent skin contact. Wear face shield and apron when splashing is likely. Launder contaminated clothing and clean protective equipment before re-use.
<b>Respiratory Protection:</b>	Use NIOSH approved equipment when airborne exposure limits are exceeded. Consult respirator manufacturer to determine appropriate type equipment for given application.
<b>Ventilation:</b>	Provide ventilation to control exposure levels below airborne exposure limits. Local exhaust ventilation preferred.
<b>Airborne Exposure Limits:</b>	Product: ortho-Dichlorobenzene wt. % 80 OSHA PEL Ceiling: 50 ppm (300 mg/m <sup>3</sup> ) ACGIH TLV® Ceiling: 50 ppm (300 mg/m <sup>3</sup> )

ortho-Dichlorobenzene has a distinct odor at concentrations well below the airborne exposure limit. It has been reported to be perceptible to most people at 2-4 ppm. At 10-15 ppm the odor becomes quite noticeable and at 25-30 ppm it becomes strong enough to become objectionable to most individuals.

para-Dichlorobenzene wt. % 17

OSHA PEL/TWA: 75 ppm (450 mg/m<sup>3</sup>)

ACGIH TLV/TWA: 75 ppm (450 mg/m<sup>3</sup>)

STEL: 110 ppm (675 mg/m<sup>3</sup>)

Trichlorobenzene wt. % 1

ACGIH TLV/Ceiling: 5 ppm (40 mg/m<sup>3</sup>)

## FIRE PROTECTION INFORMATION

<b>Flash Point:</b>	151°F	<b>Method:</b>	Cleveland Open Cup
<b>Flammable Limits in Air, % by VOL.:</b>	Lower 2.2% Upper 9.2%		
<b>Extinguishing Media:</b>	Water spray, foam, CO <sub>2</sub> , dry chemical or any Class B extinguishing agent.		
<b>Special Firefighting Procedures:</b>	Highly toxic gases (chlorides and chlorine) can be evolved in fires of this product. Wear full protective clothing and self-contained breathing apparatus where exposure to vapor or gases are possible. Firefighting equipment should be thoroughly decontaminated after use.		

## REACTIVITY DATA

<b>Stability:</b>	Product is stable under ordinary conditions of storage and handling.
<b>Materials to Avoid:</b>	Strong oxidizers, oxidizing agents; hot aluminum and aluminum alloys.
<b>Hazardous Decomposition Products:</b>	Carbon monoxide (CO), carbon dioxide (CO <sub>2</sub> ) smoke, soot and chlorides and chlorine.
<b>Hazardous Polymerization:</b>	Does not occur.

**PHYSIOLOGICAL EFFECTS SUMMARY****Human Experience**

ortho-Dichlorobenzene is absorbed through the skin and causes irritation when applied to the skin of human subjects for 15-60 minutes. Repeated or prolonged exposure may result in dermatitis or cracking of the skin. Human experience has shown that concentrations greater than 100 ppm cause irritation to the eye and respiratory tract. Continued excessive exposure has been known to lead to liver and kidney damage.

**Animal Data**

Oral LD<sub>50</sub> (Rats): 1,516 mg/kg, Slightly Toxic

Dermal LD<sub>50</sub> (Rabbit) : >10,000 mg/kg, Practically Nonirritating

Eye Irritation (Rabbit) : (24-hr Score) 12.3 on a scale of 110.0, Slightly Irritating

Skin Irritation (Rabbit) : (24-hr Score) 0.0 on a scale of 8.0, Practically Nonirritating

Microbial mutagenicity assays using five *Salmonella* strains and one yeast strain with and without mammalian microsomal activation did not reveal any mutagenic effect.

**PHYSICAL DATA**

**Appearance:** Colorless liquid, mild aromatic odor

**Boiling Point:** 180.5°C (357°F)

**Melting Point:** -17°C (+1.4°F)

**Specific Gravity @ 15°/15°C:** 1.310

**Solubility in Water @ 20°C(68°F), % by wt.:** 0.0145%

**Vapor Pressure @ 20°C (68°F):** 1 mm Hg

**Vapor Density (Air = 1):** 5.05

**Note:** These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specification items.

**SPILL, LEAK & DISPOSAL INFORMATION**

**Waste Disposal:** This product can become a hazardous waste as designated by the Environmental Protection Agency under authority of the Resource Conservation and Recovery Act (RCRA). Product (or waste) has RCRA Hazardous Waste Number U070 as designated in 40 CFR 261.33(f). Federal, state and local regulations should be followed in disposing of this substance.

**Spill or Leakage  
Procedures:**

Keep people away. Shut off or extinguish all sources of ignition. Shut off leak if without risk. Small spills, keep upwind. Large spills, evacuate area. If necessary to enter spill area, wear self-contained breathing apparatus and full protective clothing including boots. For large spills, dike and pump into salvage tank. Use water spray to knock down vapors. Soak up with sand or earth; sweep up or shovel into clean metal containers. Run-off to sewers may create health and explosion hazards; notify fire, health and pollution control authorities.

**ADDITIONAL COMMENTS**

ortho-Dichlorobenzene was evaluated in a semi-continuous activated sludge test. Primary degradation was >95%. Tested by the Thompson-Duthie-Sturm procedure, CO<sub>2</sub> evolution was 54%. Based on these two tests the biodegradability was classified as readily to intermediate.

# Monsanto MATERIAL SAFETY DATA

Page 4 of 4

**DATE:** 12/9/83  
**MSDS NO.:** 000095501

**REVISED:**

**SUPERSEDES:**

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

Monsanto Company  
800 North Lindbergh Boulevard  
St. Louis, MO 63167  
314-694-1000

ORTHO-DICHLOROBENZENE

MATERIAL SAFETY DATA

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119193  
3/92

ATTN: SAFETY DIRECTOR  
MONSANTO COMPANY

ROBYN CRANDALL R3B  
800 N LINDBERGH BLVD  
ST LOUIS MO 63157

DATE: 03/05/92  
CUST#: 325902  
PO#: R296103

M A T E R I A L   S A F E T Y   D A T A   S H E E T   PAGE 1

IDENTIFICATION

PRODUCT #: I1870-9      NAME: ISOPHORONE, 97%  
CAS #: 78-59-1  
MF: C9H14O

SYNONYMS

ISOACETOPHORONE \* ISOFORON \* ISOFORONE (ITALIAN) \* ISOPHORON \*  
ISOPHORONE \* ISOPHORONE (ACGIH, OSHA) \* IZOFORON (POLISH) \* NCI-C55618  
\* 1,1,3-TRIMETHYL-3-CYCLOHEXENE-5-ONE \* 3,3,5-TRIMETHYL-5-CYCLOHEXEN-  
1-ONE \* 3,5,5-TRIMETHYL-2-CYCLOHEXENE-1-ONE \* 3,5,5-TRIMETHYL-2-  
CYCLOHEXEN-1-ON (GERMAN, DUTCH) \* 3,5,5-TRIMETIL-2-CICLOESEN-1-ONE  
(ITALIAN) \*

TOXICITY HAZARDS

RTECS NO: GW7700000

2-CYCLOHEXEN-1-ONE, 3,5,5-TRIMETHYL-

IRRITATION DATA

EYE-HMN 25 PPM/15M  
SKN-RBT 100 MG/24H MLD  
EYE-RBT 920 UG SEV  
EYE-RBT 100 MG/24H MOD  
EYE-GPG 840 PPM/4H SEV

JHTAB 28,262,46  
JETOAS 5,31,72  
UCDS\*\* 11/15/71  
85JCAE -,290,86  
JHTAB 22,477,40

TOXICITY DATA

ORL-RAT LD50:2330 MG/KG  
ORL-MUS LD50:2690 MG/KG  
SKN-RBT LD50:1500 MG/KG  
IHL-GPG LC50:4600 PPM/8H

TXAPA9 17,498,70  
TXAPA9 17,498,70  
UCDS\*\* 11/15/71  
85JCAE -,290,86

REVIEWS, STANDARDS, AND REGULATIONS

ACGIH TLV-CL 5 PPM 85INAB 5,333,86  
MSHA STANDARD-AIR:TWA 25 PPM (140 MG/M3) DTLVS\* 3,140,71  
OSHA PEL:8H TWA 25 PPM (140 MG/M3) FEREAC 54,2923,89  
OSHA PEL FINAL:8H TWA 4 PPM (23 MG/M3) FEREAC 54,2923,89  
NIOSH REL TO KETONES(ISOPHORONE)-AIR:10H TWA 23 MG/M3 MMWR\*\* 37(S-7),  
18,88

NOES 1983: HZD 40910000; TNF 43; NIS 3593; NOS 47; TNE 47097; TFE  
10353

ATSDR TOXICOLOGY PROFILE (NTIS\*\* PB/90/180225/AS)

EPA TSCA 8(A) PRELIMINARY ASSESSMENT INFORMATION, FINAL RULE FEREAC  
47,26992,82

ON EPA IRIS DATABASE

EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, MARCH 1991

NIOSH ANALYTICAL METHODS: SEE ISOPHORONE, 2508

NTP CARCINOGENESIS STUDIES (GAVAGE);SOME EVIDENCE:RAT NTPTR\* NTP-TR-  
291,86

NTP CARCINOGENESIS STUDIES (GAVAGE);EQUIVOCAL EVIDENCE:MOUSE NTPTR\*

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T   P A G E   2

CUST#: 325902  
PO#: R296103

PRODUCT #: I1870-9  
CAS #: 78-59-1  
MF: C9H14O

NAME: ISOPHORONE, 97%

----- TOXICITY HAZARDS -----

NTP-TR-291, 86

TARGET ORGAN DATA

SENSE ORGANS AND SPECIAL SENSES (OTHER OLFACTION EFFECTS)  
SENSE ORGANS AND SPECIAL SENSES (CONJUNCTIVA IRRITATION)  
LUNGS, THORAX OR RESPIRATION (OTHER CHANGES)

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS)  
DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

----- HEALTH HAZARD DATA -----

ACUTE EFFECTS

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.  
CAUSES SEVERE EYE IRRITATION.  
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER  
RESPIRATORY TRACT.  
CAUSES SKIN IRRITATION.  
SYMPTOMS OF EXPOSURE MAY INCLUDE BURNING SENSATION, COUGHING,  
WHEEZING, LARYNGITIS, SHORTNESS OF BREATH, HEADACHE, NAUSEA AND  
VOMITING.  
MAY BE READILY ABSORBED THROUGH SKIN.

CHRONIC EFFECTS

CARCINOGEN.  
EXPOSURE CAN CAUSE:  
CNS DEPRESSION  
TARGET ORGAN(S):  
KIDNEYS  
LUNGS

CENTRAL NERVOUS SYSTEM

FIRST AID

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS  
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED  
CLOTHING AND SHOES.  
ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS  
WITH FINGERS.  
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL  
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.  
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.  
CALL A PHYSICIAN.  
DISCARD CONTAMINATED CLOTHING AND SHOES.

----- PHYSICAL DATA -----

BOILING PT: 213 C TO 214 C

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T   P A G E   3

CUST#: 325902  
PO#: R296103

PRODUCT #: I1870-9  
CAS #: 78-59-1  
MF: C9H14O

NAME: ISOPHORONE, 97%

----- PHYSICAL DATA -----

MELTING PT: -8 C  
SPECIFIC GRAVITY: 0.923  
APPEARANCE AND ODOR  
LIGHT-YELLOW LIQUID

----- FIRE AND EXPLOSION HAZARD DATA -----

FLASHPOINT: 184 F  
LOWER EXPLOSION LEVEL: .8%  
UPPER EXPLOSION LEVEL: 3.8%  
EXTINGUISHING MEDIA  
WATER SPRAY.  
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.  
SPECIAL FIREFIGHTING PROCEDURES  
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO  
PREVENT CONTACT WITH SKIN AND EYES.  
COMBUSTIBLE LIQUID.  
UNUSUAL FIRE AND EXPLOSIONS HAZARDS  
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

----- REACTIVITY DATA -----

INCOMPATIBILITIES  
STRONG OXIDIZING AGENTS  
STRONG ACIDS  
STRONG BASES  
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS  
TOXIC FUMES OF:  
CARBON MONOXIDE, CARBON DIOXIDE

----- SPILL OR LEAK PROCEDURES -----

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED  
EVACUATE AREA.  
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY  
RUBBER GLOVES.  
WEAR DISPOSABLE COVERALLS AND DISCARD THEM AFTER USE.  
COVER WITH DRY LIME OR SODA ASH, PICK UP, KEEP IN A CLOSED CONTAINER  
AND HOLD FOR WASTE DISPOSAL.  
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.  
WASTE DISPOSAL METHOD  
THIS COMBUSTIBLE MATERIAL MAY BE BURNED IN A CHEMICAL INCINERATOR

CONTINUED ON NEXT PAGE

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M A T E R I A L   S A F E T Y   D A T A   S H E E T   P A G E   4

CUST#: 325902  
PO#: R296103

PRODUCT #: I1870-9  
CAS #: 78-59-1  
MF: C9H14O

NAME: ISOPHORONE, 97%

----- SPILL OR LEAK PROCEDURES -----

EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.  
SAFETY SHOWER AND EYE BATH.  
USE ONLY IN A CHEMICAL FUME HOOD.  
DO NOT BREATHE VAPOR.  
AVOID ALL CONTACT.  
WASH THOROUGHLY AFTER HANDLING.  
HARMFUL LIQUID.  
CARCINOGEN.  
LACHRYMATOR.  
SEVERE EYE IRRITANT.  
KEEP TIGHTLY CLOSED.  
KEEP AWAY FROM HEAT AND OPEN FLAME.  
STORE IN A COOL DRY PLACE.

LABEL PRECAUTIONARY STATEMENTS

TOXIC  
MAY CAUSE CANCER.  
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.  
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.  
RISK OF SERIOUS DAMAGE TO EYES.  
LACHRYMATOR.  
COMBUSTIBLE.  
TARGET ORGAN(S):  
CENTRAL NERVOUS SYSTEM  
LUNGS  
IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW THE LABEL WHERE POSSIBLE).  
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE.  
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE PROTECTION.  
DO NOT BREATHE VAPOR.

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MONSANTO COMPANY  
INFORMATION CENTER  
CREVE COEUR

M A T E R I A L   S A F E T Y   D A T A   S H E E T

DATE: 01/27/86

CUST # 325902 P.O. # 0010789

PAGE: 1

SECTION I   PRODUCT IDENTIFICATION

12833-3   FLUORENE, 98%  
CAS # 86-73-7  
MOLECULAR FORMULA: C<sub>13</sub>H<sub>10</sub>

SECTION II   TOXICITY HAZARDS

RTECS # LL5670000  
FLUORENE

CARCINOGENIC REVIEW: ANIMAL INDEFINITE IARC\*\* 32,365,83  
REPORTED IN EPA TSCA INVENTORY, 1983  
EPA GENETIC TOXICOLOGY PROGRAM, JANUARY 1984

SECTION III   PHYSICAL DATA

MELTING POINT: 112 C TO 115 C  
BOILING POINT: 298 C

SECTION IV   FIRE AND EXPLOSION HAZARD DATA

EXTINGUISHING MEDIA:

WATER SPRAY.  
CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.

SPECIAL FIRE FIGHTING PROCEDURES:

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

NOT APPLICABLE

SECTION V   HEALTH HAZARD DATA

HARMFUL IF INHALED OR SWALLOWED.  
MAY CAUSE IRRITATION.  
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

FIRST AID:

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES.

IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS AMOUNTS OF WATER.

IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION, PREFERABLY MOUTH-TO-MOUTH. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

CALL A PHYSICIAN.

WASH CONTAMINATED CLOTHING BEFORE REUSE.

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DATE: 01/27/86 CATALOG # 12833-3 CUST # 325902 P.O. # 0010789

PAGE: 2

SECTION VI   REACTIVITY DATA

INCOMPATIBILITY:

STRONG OXIDIZING AGENTS

HAZARDOUS DECOMPOSITION PRODUCTS:

TOXIC FUMES OF:

CARBON MONOXIDE, CARBON DIOXIDE

SECTION VII   SPILL OR LEAK PROCEDURES

SPILLS OR LEAKS:

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.

SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.

AVOID RAISING DUST.

VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL:

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

OBSERVE ALL FEDERAL, STATE & LOCAL LAWS CONCERNING HEALTH & POLLUTION.

SECTION VIII   PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

CHEMICAL SAFETY GOGGLES.

RUBBER GLOVES

OSHA/MSHA-APPROVED RESPIRATOR.

SAFETY SHOWER AND EYE BATH.

MECHANICAL EXHAUST REQUIRED.

AVOID CONTACT AND INHALATION.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

KEEP TIGHTLY CLOSED.

USE WITH ADEQUATE VENTILATION.

STORE IN A COOL DRY PLACE.

SECTION IX   SPECIAL PRECAUTIONS AND COMMENTS

NOT APPLICABLE

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